"BATTLESTAR GALACTICA"

NOVEMBER 1978 #6

FUTURE

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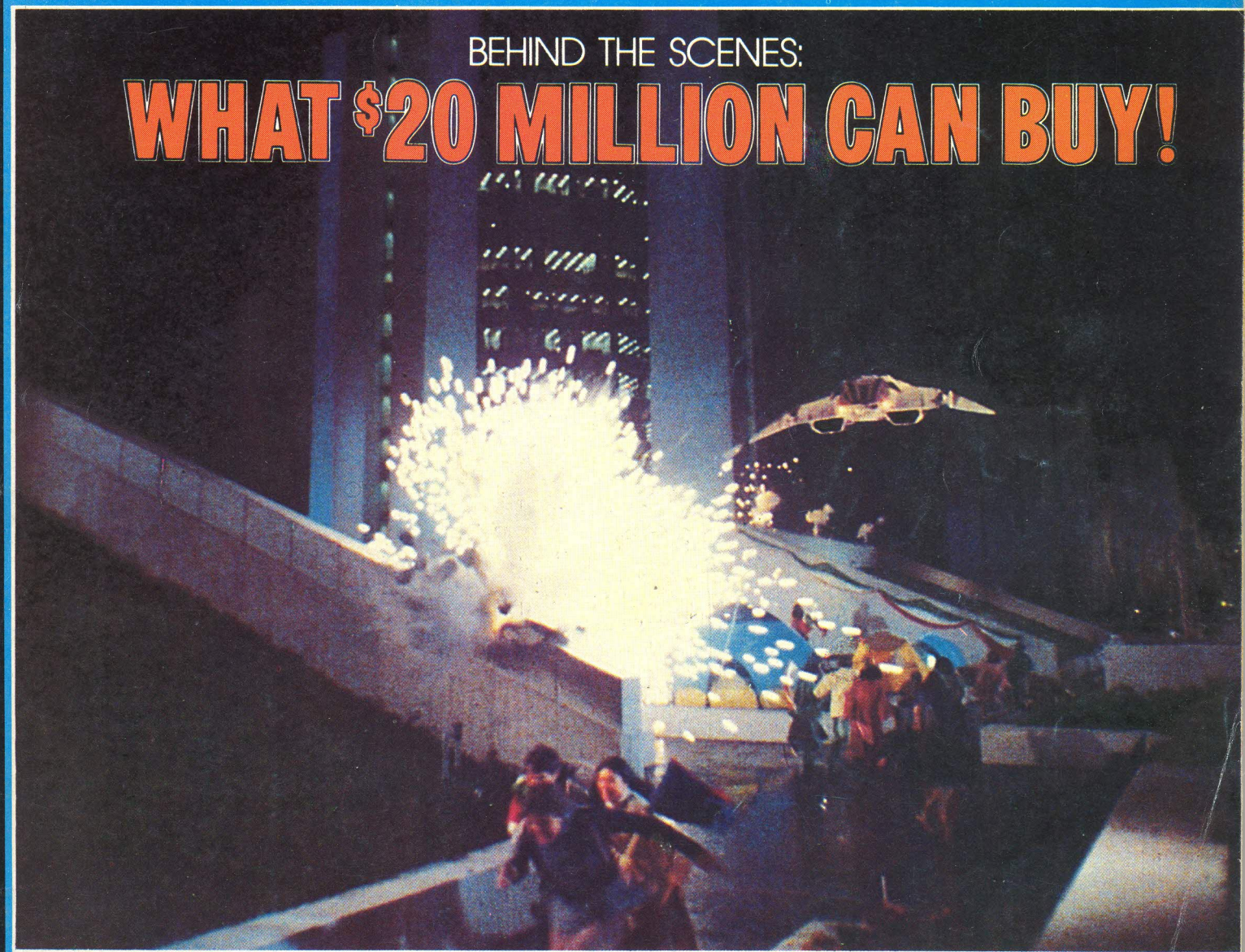

Cylon Saucers destroy the Caprica Presidium in ABC's "Battlestar Galactica" (see page 42)

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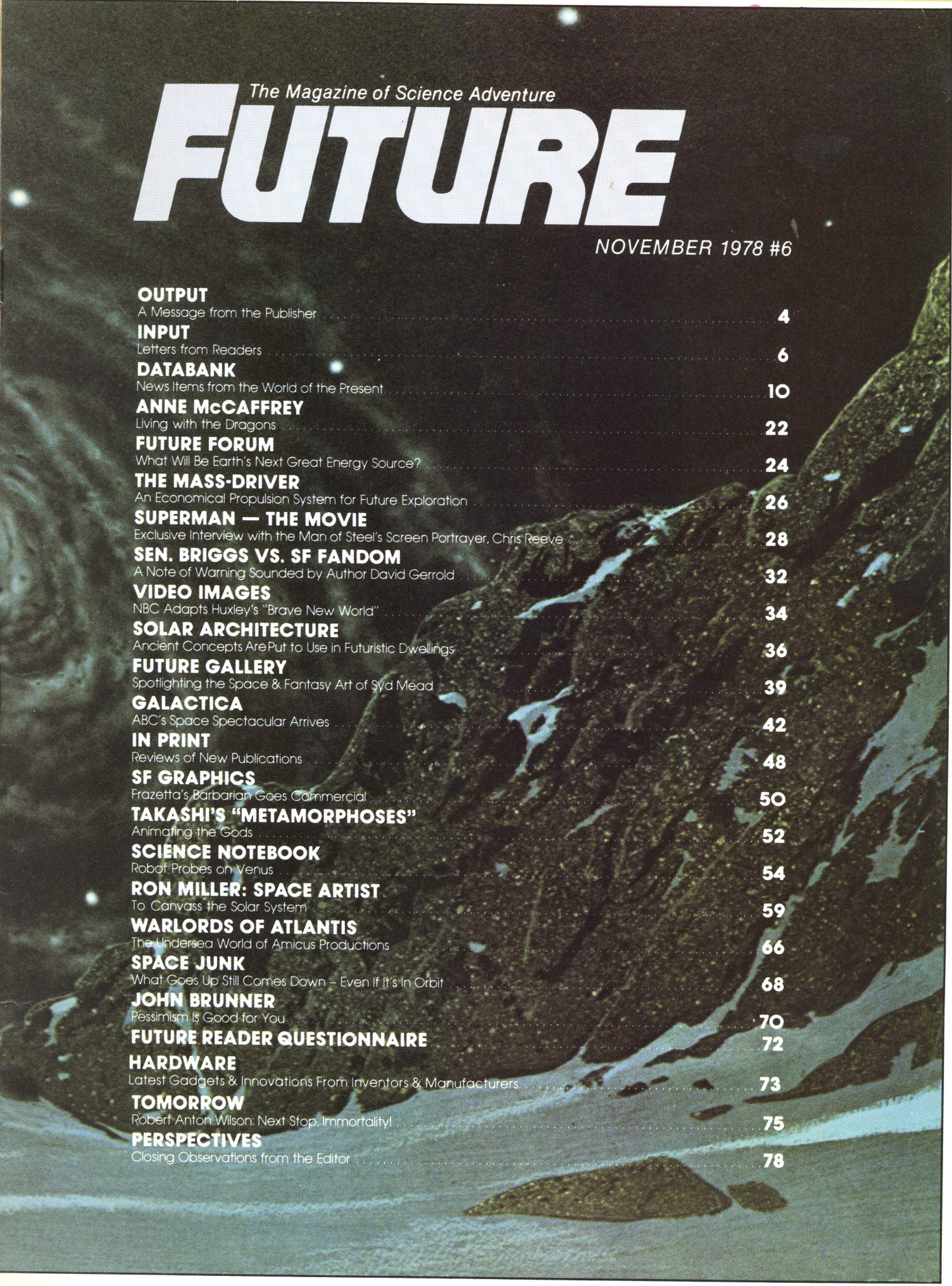

The Magazine of Science Adventure

FUTURE

NOVEMBER 1978 #6

FUTURE
NOVEMBER 1978 #6

Business and Editorial Offices:
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New York, N.Y. 10016

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ON THE COVER: An exciting scene from ABC TV's new *Battlestar Galactica*. All the trouble starts when Cylon saucers attack world government headquarters on the planet Caprica. See page 42 for the *Galactica* story.

FUTURE is published eight times a year or about every six and a half weeks by Future Magazine, Inc., 475 Park Avenue South, New York, NY 10016. This is issue Number 6, Volume 1, November 1978.

Subscription rates: $10.98 for eight issues delivered in U.S. and Canada; foreign subscriptions $17.00 in U.S. funds. Change of address notice should be sent to FUTURE Subscription Dept. P.O. Box 2001, Farmingdale, NY 11737. FUTURE accepts no responsibility for unsolicited manuscripts, photos, art or other materials, but if free-lance submissions are accompanied by a stamped, self-addressed envelope they will be considered and, if necessary, returned.

output

Several weeks before the content of this issue was finalized, one of our editors approached me with strong objections to the article by David Gerrold, "Sen. Briggs vs. SF Fandom."

The editor's stated objections were twofold: (1) a subject as controversial and emotionally charged as homosexuality is dangerous to the health of a young magazine like FUTURE, and (2) articles dealing with subjects like this are out of place in FUTURE.

Although I disagreed strongly with both objections and obviously decided to run the article, our conversation made me pause and think. Since the editor had not stated a disagreement with Gerrold's *position*, I wondered why anyone would fight against a public statement of what they considered a humane and logical argument. Why would anyone want our magazine to avoid publishing an opinion article simply because not everyone would agree with the author?

It isn't necessary for *all* our readers to agree with all our ideas. It isn't necessary for all our *staff* to agree on every idea. Intelligent disagreement is often quite healthy within a magazine family.

Let me state my replies to the two objections that were raised.

(1) I am not interested in giving birth to and raising a magazine which is a moral coward. A magazine of integrity, just like a human being, does not buckle under and run away whenever faced with disagreements and objections from others. If standing firm is dangerous to our health (which I do not believe), then we choose to live dangerously. If there are those in our audience who cannot tolerate seeing ideas with which they disagree expressed *at all*, then let *them* run away. Personally, I have always found well-written, thought-provoking articles fascinating, whether they presented ideas with which I agreed or disagreed. In fact, usually an *opposite* point of view will change your mind or reinforce your current position much better than an article which merely parrots what you already believe. It's called *stimulation*, and that's one of the goals of FUTURE.

(2) Another of our goals is to present what life in the future *can* be and *ought* to be — the potentials and the ideals of the human race. The name FUTURE does not limit our magazine to articles on science and technology. For decades, one of the main problems in the world has been that our scientific progress has far outdistanced our humanitarian progress. If our future on this planet is to be a good one, we must not find ourselves living amid computers, skyscrapers and spaceships while continuing to behave like sub-rational beings in our relationships with each other.

Gerrold's main theme dramatizes that even as remote an event as a California referendum touches science-fiction fandom — that no area of life is unrelated to the future — that science fiction is not a separate isolated world. Articles of this sort, and others dealing with social, political, moral and philosophical issues — and their relationship to science fiction and future life — are very much in place in FUTURE.

These are statements of FUTURE's editorial policy — they need to be said — clearly and without mumbling. You deserve to know what kind of spine the magazine you're reading has. If this frightens you or makes you uneasy or angry, then I suggest that you are not truly concerned with tackling the realistic problems of the future.

Every generation has an opportunity to form their immediate future — for better or for worse. I would like to think that our magazine has a strong hand in helping that formation along rational, loving and positive lines. I would like to think that all our readers will join us — not agreeing necessarily on each specific issue, but certainly not avoiding controversy or restricting the range of our concerns.

Finally, I can only guess at the motivation in wanting our magazine to be anything *less* than it can be — in wanting us to remain silent and avoid a stand. But I do know that moral silence, throughout history, has been the only accomplice evil has needed.

Kerry O'Quinn/Publisher

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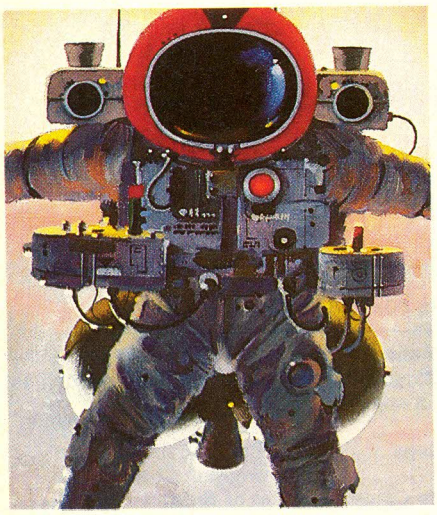
KAY'S OK

...I really liked Joseph Kay's article on science-fiction pulps. My brother and I just started buying pulps about five months ago and are still a little unfamiliar with them. Besides being very enjoyable, Joe's article helps us decide which magazines to keep an eye open for. I hope to hear more of Joseph Kay in FUTURE and STARLOG . . . or anywhere else for that matter! He certainly is talented.

Bill Smith
Columbia, SC

Rest assured that Mr. Kay will be contributing to both STARLOG and FUTURE for quite some time to come.

McCALL PAINTINGS



. . . While reading FUTURE #4 I couldn't help but admire Bob McCall's beautiful art work on page 67, "Spaceflight." Is there any remote chance of acquiring it as a poster?

James Hrynyshyn
Dryden, Ontario

The painting you refer to was used as the color illustration to McCall's hardback book, Our World In Space, *with text by Isaac Asimov. The book is published by New York Graphic Society in Greenwich, Connecticut. The painting is* not *available as a poster, but we are offering some other fantastic McCall art prints (see ad in this issue) and he is one of the artists selected for inclusion in The SPACE ART Club. Information on joining is included in this issue.*

RELIEF FROM CAUSES

. . . I disagree with your policy and agree with Samuel James Maronie who wrote to say that "ERA has no place in FUTURE." There are just too many causes out there, very few of which really matter. All of a sudden everyone has rights . . . from the lowest criminal to the biggest crook of a President. All of a sudden, everyone wants to get back to their roots. Somewhere along the way it was forgotten that coming to America meant that you became an American! So whether it's equal rights, roots, ruts, causes, dogs, kids, or whether Heinz should have 58 varieties — WHO CARES!

Ronald N. Waite
108 Estates Blvd. apt. 208
Trenton, NJ 08610

FUTURE THOUGHT

. . . We were disappointed to learn that our space organization had not been listed in the August 1978 issue of FUTURE regarding those groups devoted to futuristic thought. *The United States Space Education Association* was founded in 1973 as the first space organization for public education of space exploration benefits. As such, we are dedicated to peaceful exploration of space and the use of technology for the benefit of all humanity. The use of technology in the future has always been a concern of the USSEA.

Steven M. Cobaugh
International President, USSEA
746 Turnpike Road
Elizabethtown, PA 17022

WHERE IS IT?

. . . How could you do it? In your October issue you had an article about a wonderful store, the Fantasy Castle, but never said where in California it is! It is very cruel of you to tease your readers this way. Please tell us!

Debbie Miller
2611 Steeplechase Ln.
Diamond Bar, CA

. . . In issue three you featured a story about SF toys, including a stuffed R2-D2 doll and "The Death Star Space Station." I would like to know where I can get more information on these items.

R.A. Wolf
374 Hilton Ave.
Youngstown, OH

We apologize for these oversights, but rest assured cruelty had nothing to do with the omissions. For all the impatient patrons out there: Fantasy Castle is in Woodland Hills, California. The two largest SF toy manufacturers are Kenner Products, 1014 Vine Street, Cincinnati, Ohio, 45202, and Mego Toys, 41 Madison Ave., New York, N.Y. 10010.

SKYWALKER SERIES

Photo: © 1977 Twentieth Century-Fox

. . . In your article on *Star Wars II* in FUTURE #3, you stated that the script by Leigh Brackett was to be based on the second of twelve stories from *The Adventures of Luke Skywalker* series of stories. Could you tell me if these stories by George Lucas are available somewhere? I would very much like to read them.

Bob Detwiler
Creswell, OR 97426

Sorry, Bob, according to SW *producer Gary Kurtz, the dozen Skywalker stories exist only in outline form; sort of extended film treatments. By the by, to add intrigue to the* Star Wars *sequel, Kurtz recently informed us that the sequel is really based on the* fifth *story and the original blockbuster film based on the* fourth!

BOVA'S TOMORROW

. . . I read with great interest Ben Bova's "Tomorrow" column in FUTURE #4, and I have a question that I hope he might be able to answer. He pointed out in the article that he doubts that international agreements on the peaceful uses of space will be made. Also, he made the point that even if they are realized, we will still have to combat terrorism and guerrilla warfare in space. Does Mr. Bova think that there will be a "disinterested third party" similar to the one he visualized in his book *Millennium* or some other phenomenon/catastrophe incident to make the superpowers, and even third world countries, realize that space is not the place for military hostilities, except where those hostilities apply to the defense of humanity and the Earth as a whole?

Danny Bates
Dallas, TX

Replies Bova; "Millennium *is, of course, fiction. While I do believe that the people who live and work in space* permanently *will eventually form a political power that will interface with terrestrial international politics, I don't really think this will happen during the Twentieth Century. It would take a truly extraordinary series of events and a truly extraordinary person — such as Chet Kinsman — to make "space politics" a reality before AD 2000.*

(continued on next page)

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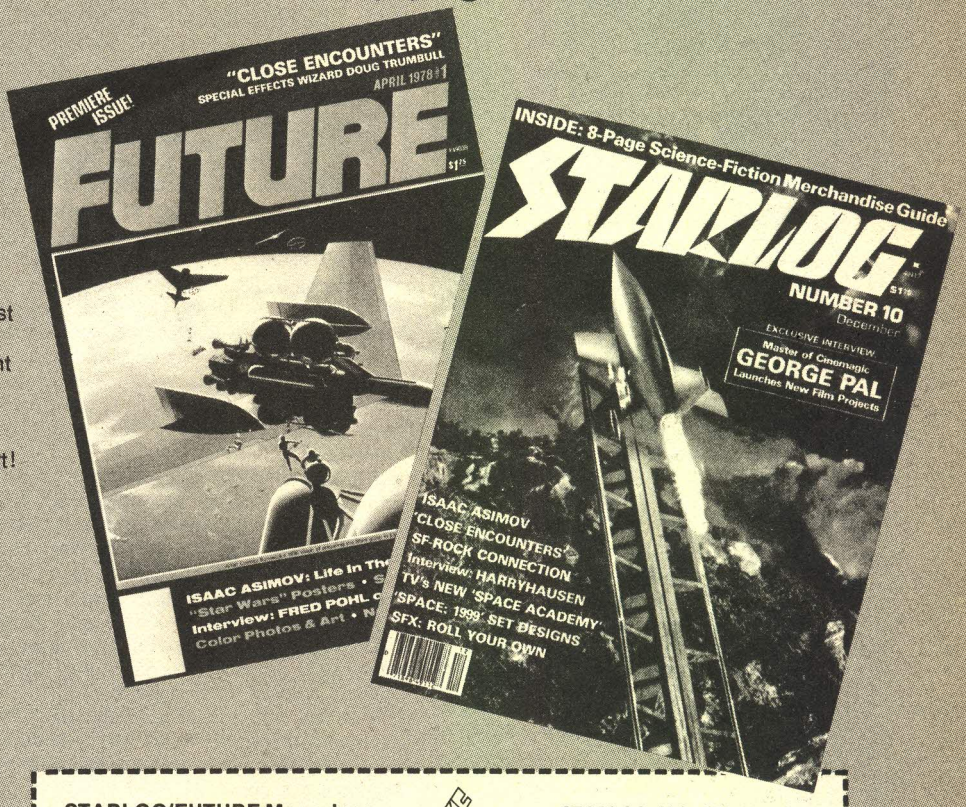

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(Continued from page 6)

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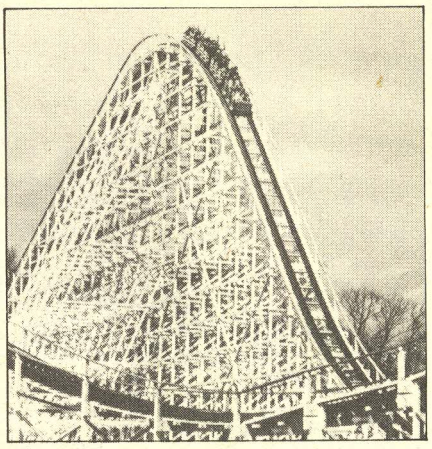

The editorial staff of STARLOG and FUTURE is in the process of assembling a Color Photo Guidebook on Roller Coasters of America. Scheduled for publication in May of 1979, this large-size quality paperback book will include a comprehensive directory of all coasters in this country, along with color and black & white photos.

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We might write to you for additional information, but if your photos are used in the book, you will be listed as a contributor and receive a complimentary copy.

Send all information and photos to:
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RollerCoaster Fever
475 Park Ave. South
New York, NY 10016

ANYTHING FOR ATTENTION

. . . To me, Joanna Russ (FUTURE #4, "Future Forum") comes across as a science-fiction writer who doesn't know what she is talking about. Anyone who thinks *Star Wars* features "the stalest and silliest of plots" must also feel that one needs a Ph.d (sic) in Physics to produce a good movie. George Lucas should be commended for creating a story that can capture the attention of millions and provide so much entertainment. Ms. Russ was asked to reply about her most- and least-favorite science-fiction movies. Instead, she comes back with some degrading remarks directed at a fantasy movie that was never meant to contain any type of message. The radio commercial for *Star Wars* said, "Never before was so much time or so much money spent . . . just for fun." If she wants a SF film with an involved plot, then she can sit in a movie theatre and watch *2001* until her eyes fall out. Harlan Ellison has already given SF writers a bad name, but if Joanna Russ wants to join him as a non-conformist, attention-seeking troublemaker, she's welcome to do so. I really doubt that anyone intelligent will listen to her, anyway.

Michael Villa
Holyoke, MA 01040

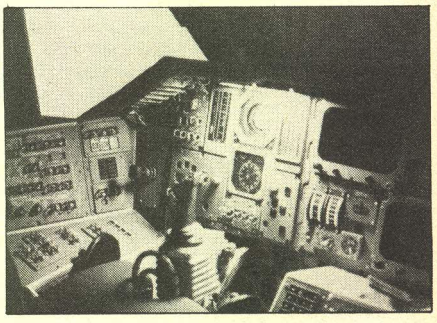
You're entitled to your opinion, Michael, just as Ms. Russ is to hers. As for Harlan Ellison's reputation, in most circles he is considered an exceedingly talented (albeit opinionated) artist. And there's nothing degrading about having a reputation like that!

NOISY SF

. . . I felt strongly motivated to write this letter after reading Ms. Ursula K. LeGuin's thought provoking article in FUTURE #4 entitled "Noise and Meaning In SF Films." Her views parallel my own and I feel very strongly about the subject. For several years it has seemed that films in the genre have lacked a sense of humanity and a sincere emotional quality. Ms. LeGuin's example of excessive sound levels is just one instance of the modern filmmakers' lean toward harsh, generally mechanical devices that do little more than assault the sensibilities of the moviegoer. A good filmmaker should have the ability to emotionally and intellectually stimulate his audience without resorting to stoic gimmickry and tasteless exercises. I am worried about the film industry. With all the millions being spent on recent efforts, I find that the majority of the movies are not reaching the audience in any deeply emotional and intellectual sense. The films have become mechanical, animated, matted and Dolbyed monsters that mean nothing.

William J. Norton
Pamona, CA 91768

L-5 ERROR



. . . Please take notice of the inaccurate captioning of the upper photograph on page 54 of the August 1978 issue of FUTURE within your article on the L-5 Society. The caption reads, "Carolyn Henson flies space shuttle simulator at Rockwell's Downey, Calif., plant where space shuttles are under construction." The location of the photo is properly identified as the cabin of the space shuttle *mock-up* (witness the lack of true instrumentation). Enclosed is a photograph of the interior of a space shuttle mission *simulator*. The Lyndon B. Johnson Space Center possesses two of these simulators, and it is in one of these that I took a picture.

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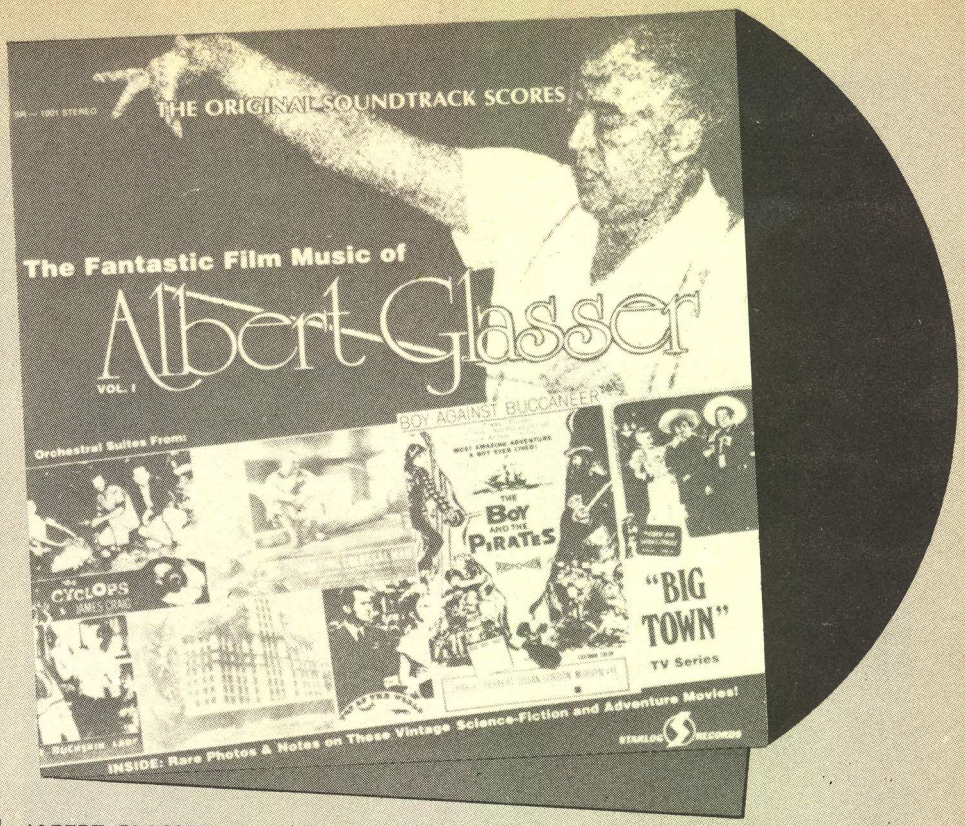

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BRITISHERS PLOT ROBOT STARSHIP

Art: Ted Enik

A robot starship designed to make a 50-year trip to Barnard's Star — six light years away — has been proposed by members of the British Interplanetary Society. In the first detailed study of an interstellar space mission, the BIS report, *Project Daedalus,* envisions an automated probe that would accelerate to 12 percent the speed of light to reach Barnard's Star, a red dwarf which is the second closest star to the Sun. (Only the triple star Alpha Centauri is nearer.)

Barnard's Star is of special interest because some astronomers believe it has planets whose gravitational pull would account for the way the star wobbles slightly in its path through space. For that reason the Daedalus probe is designed to carry sub-probes which could be launched to study any planets that may circle Barnard's Star.

The huge, two-stage Daedalus probe would be powered by laser fusion pulse engines. The spacecraft would be pushed along through space by a continuous series of controlled nuclear explosions, as fuel pellets are imploded in a combustion chamber by laser beams.

For fuel, the probe would need 30,000 tons of helium-3 and 20,000 tons of deuterium. The authors of the study believe the best source of helium-3 is the atmosphere of the planet Jupiter, where it could be extracted by compressors suspended from giant balloons.

The probe itself would be assembled in space, perhaps in orbit around Jupiter's moon, Callisto. That will be possible only when spaceflight within the solar system is relatively commonplace.

During its long flight the probe would be run by onboard artificial intelligence. Small robot manipulator vehicles called "wardens" would move around the probe to perform maintenance and repairs. Direct command and control from Earth would not be workable, since a one-way message from the probe would take as long as six years to reach our solar system.

The authors of the report, who invested 10,000 hours of unpaid work on the study, believe that the launching of a star probe can only be achieved by a solar system civilization that is much richer than present Earthbound societies. Since design and manufacture would take 15 to 20 years, the flight about 50, and the return of information by radio at least six years, the entire mission would require a commitment of support for 70 to 80 years. *Project Daedalus* authors predict it will not be possible to launch such a star probe until the latter part of the 21st Century.

The British Interplanetary Society was the first organization to do a study of how to design a Moonship — in the years 1937-1939. The Lunar Excursion Module which landed Neil Armstrong and Edwin Aldrin on the Moon in 1969 had many of the features proposed in the Moonship Study 30 years earlier.

The starship project began in 1973 and since 1974 the *Journal of the British Interplanetary Society* has published four special issues a year containing technical papers and philosophical articles on interstellar travel and communication.

Limited quantities of the *Project Daedalus* report are available for $8.00 from the British Interplanetary Society, 12 Bessborough Gardens, London SWIV 2JJ, United Kingdom.

— Michael A.G. Michaud

SEATTLE IS ILLUMINATED

An ambitious science-fiction theatrical event will make its North American premiere in Seattle on Sept. 20. "Illuminatus!" played to standing-room-only crowds in The National Theatre of Great Britain and now it's set for a 96-day engagement at The Empty Space in Seattle.

The play is performed in three parts — one per night — corresponding to the three books in the *Illuminatus!* trilogy by Robert Shea and Robert Anton Wilson. Fast becoming cult classics, the *Illuminatus!* books tie everything from the CIA, Atlantis and pyramid power to UFOs, rock bands, political assasinations and H.P. Lovecraft monsters together into the most massive, time-space spanning conspiracy theory ever imagined.

For serious students of illumination, the entire trilogy can be seen in marathon performances on Saturdays and Sundays in December. *— Robin Snelson*

SPACE SHUTTLE VS. BROWN PELICAN

In its journey from engineers' drawing boards to business-as-usual space trucking company, the space shuttle has had to overcome plenty of obstacles. The complicated technology problems pale in the light of political and economic hurdles. But progress hobbles on toward the time, in the mid-1980s, when shuttles will regularly blast off and return for landings at two Earth bases: Kennedy Space Center in Florida and Vandenberg Air Force Base in Southern California.

Now the environmentalists have a bone to pick with space shuttle operations. Seems that sonic booms caused by launches and landings from the Vandenberg site may pose a threat to a bird which is on the endangered species list.

The brown pelican makes its home in the Channel Islands, just off the coast of California from Vandenberg. Their nesting site on Anacapa Island is considered a "critical habitat," which means that if it becomes unlivable the pelican might well become exinct.

Under the Endangered Species Act, any federally funded project that might infringe upon species listed under the Act must be carefully studied. When the Air Force's obligatory environmental impact statements were read by the Fish and Wildlife Service, the watchdog agency for the Act, Vandenberg was requested to submit detailed studies on exactly what effect the shuttle flights will have on the brown pelican and other aquatic birds that inhabit the Channel Islands.

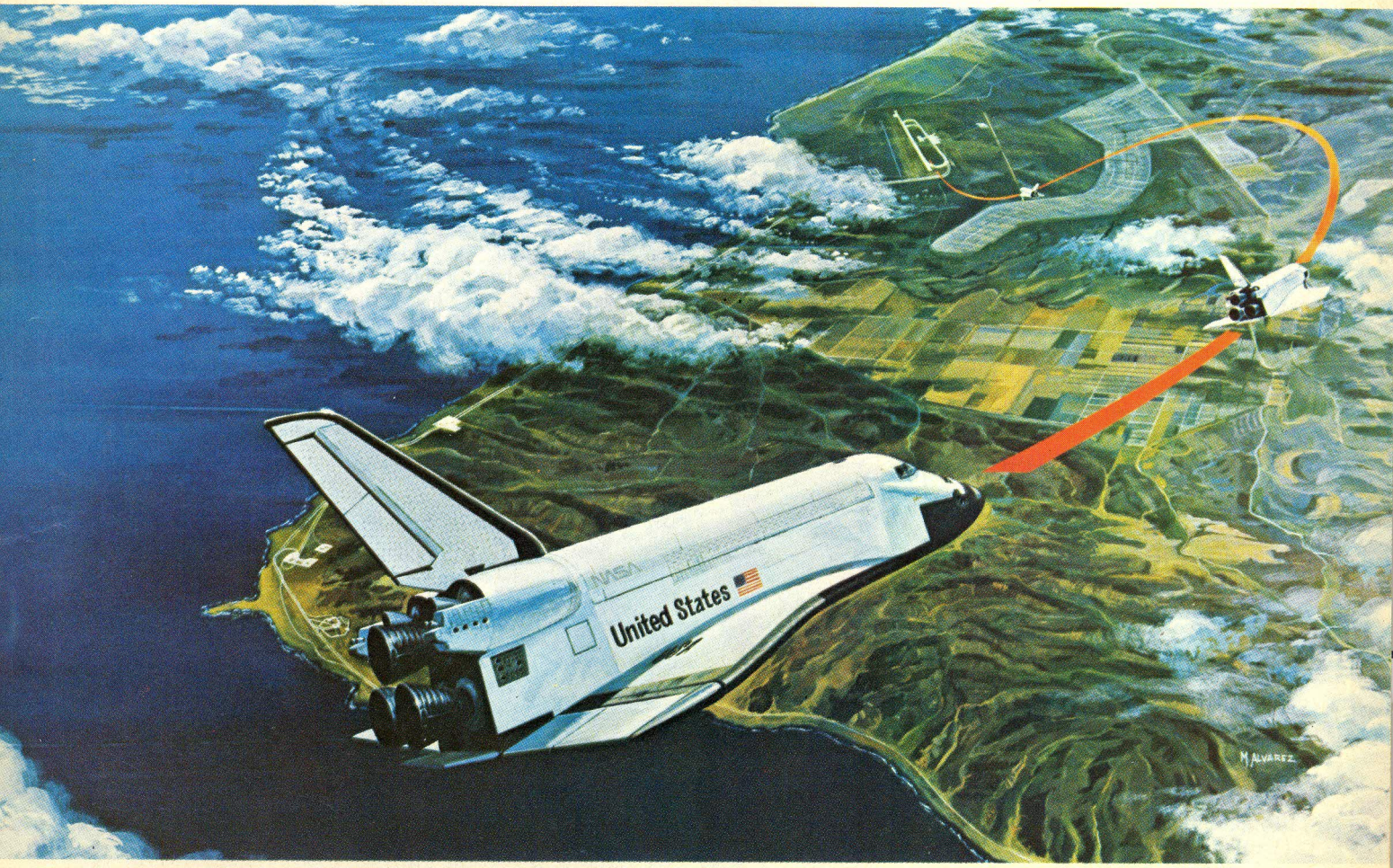
Studies are now underway at San Diego State University and Seaworld. If any severely unsettling problems look probable—such as egg breakage, or interference with the pelicans' nesting and mating —the Air Force may find its space program under attack by environmentalists and the enforcers of the Act, the Interior Department.

Vandenberg got into the picture as a shuttle base for two reasons: A west coast launch makes it possible to reach a polar orbit, deemed valuable mainly for strategic military purposes. Second, Vandenberg almost made it as a space base back in the 1960s—until the Air Force's planned Manned Orbiting Laboratory was scrapped by Congress. The beginnings of that base will soon be remodeled to serve the shuttle.

Hopes are high—both in the ranks of environmentalists, the Interior Department and among Air Force officials—that the brown pelican won't be seriously threatened by the shuttle. Since the Endangered Species Act was instituted six years ago, several thousand cases have been investigated and resolved with little trouble. Only a handful—notably the famous snail darter—have ever gone to court.

—Bob Woods

Space shuttle landings and liftoffs from Vandenberg Air Force Base in southern California are being studied for hazards to nearby wildlife.



Art: Rockwell International Space Division

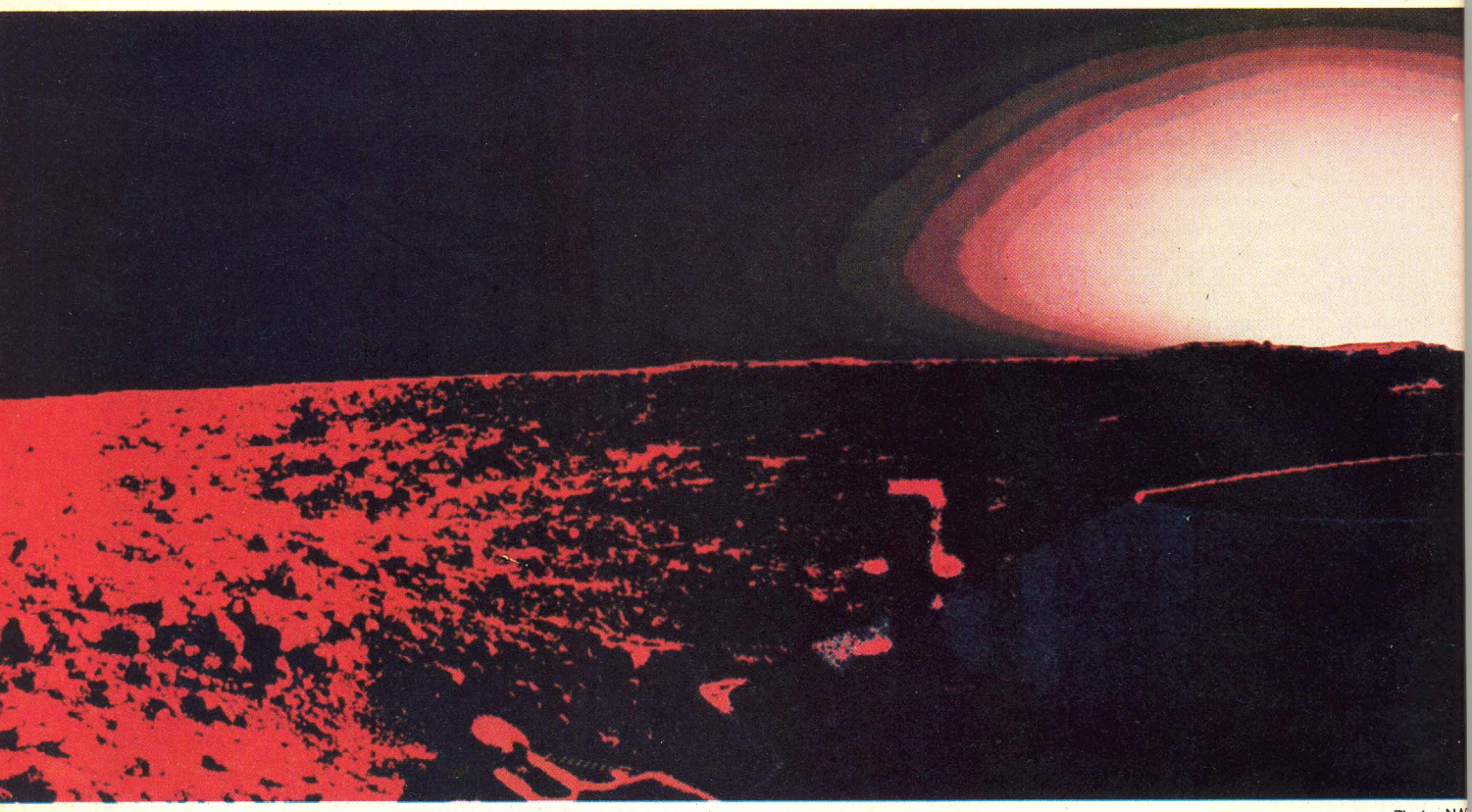


Photo: NA

Computer-enhanced Martian sunset from Viking 1 over-emphasizes faint color variations, like turning up a TV brightness control.

NASA TAKES US BACK TO MARS

In the summer of 1976, TV viewers were treated to a unique, unearthly experience. Two highly sophisticated Viking robots sent back "live" full-color pictures of the Martian landscape. Incredibly clear, computer-enhanced photos — including the dazzling sunset on Mars panorama shown here — were released by NASA and picked up by the media. However, even an event this dramatic cannot hold the national spotlight forever. Coverage soon waned and, ultimately, disappeared.

Now, two years later, NASA is preparing to release a handsome new book containing 226 fabulous photos of the red planet. It is called, simply, *The Martian Landscape*. This landmark publication will also have a running commentary by members of the Lander Imaging Team — the engineers and scientists who developed the methods used to photograph the surface of Mars.

About 20 of the pictures are in computer-enhanced color and 18 of the photos are stereo pictures, with 3-D glasses included in the back of the book for your convenience. This 160-page, hardbound edition sells for $12. To order, write for *The Martian Landscape,* NASA SP425, Supt. of Documents, Government Printing Office, Washington, D.C. 20402 (stock no. 033-000-00716-7).

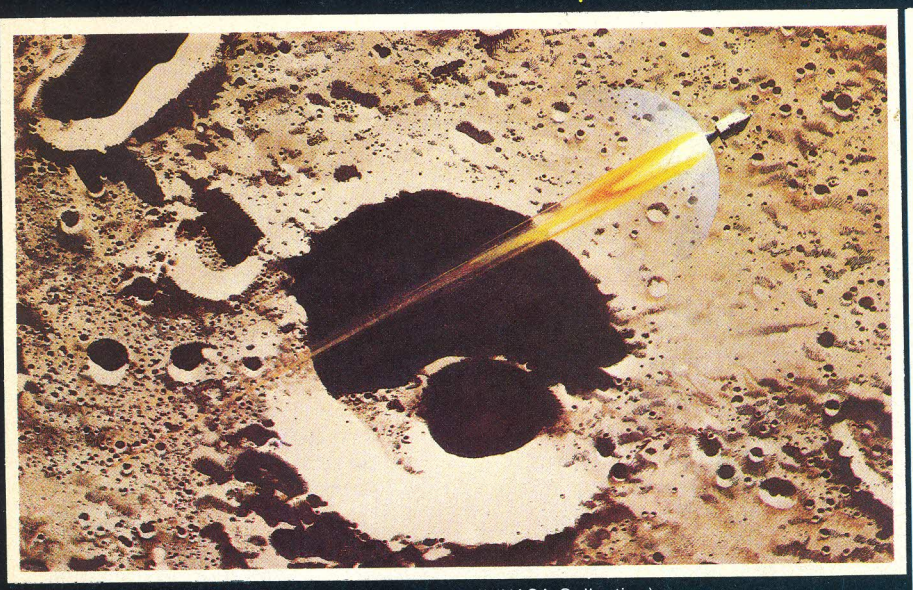
— *Robin Snelson*

STAR TREK MOVIE ON THE WAY

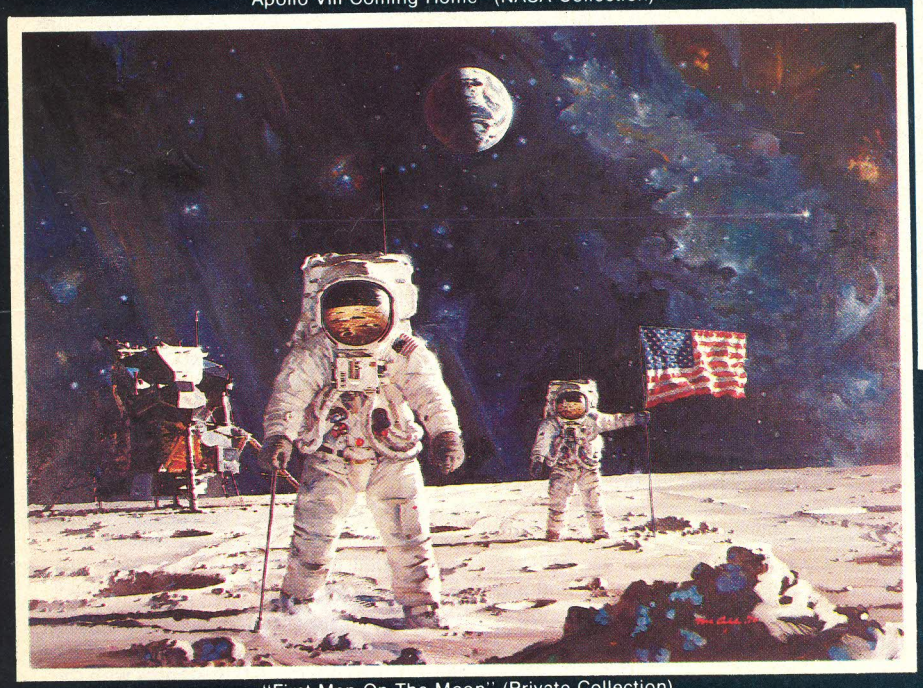
Production began, last month, on *Star Trek — The Motion Picture* on the Paramount lot in Hollywood. The film, directed by Robert Wise and produced by Gene Roddenberry, reunites the original *Star Trek* TV cast. Shown in their new uniforms are (front row, left to right) Nichelle Nichols, Leonard Nimoy, William Shatner, DeForest Kelley and George Takei; and (back row) Walter Koenig, Majel Barrett, Grace Lee Whitney and James Doohan. The movie concerns a hideous alien force, unwittingly unleased by three Klingon Cruisers, which heads for Earth on a collision course. It's up to the refurbished *Enterprise* to save the day.

Photo: © 1978 Paramount

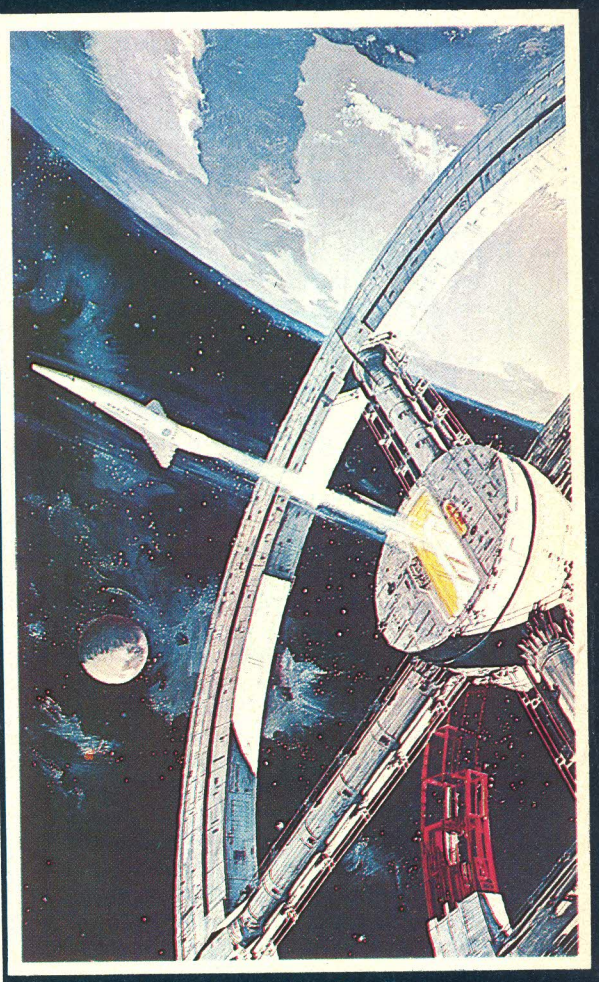
Robert McCall's Contemporary Classics



"Apollo VIII Coming Home" (NASA Collection)



"First Men On The Moon" (Private Collection)



"Space Station One" A 24 × 28 inch lithograph

In the future Man will use his down-to-earth technology to reach deep into the awesome infinity of outer space. Robert McCall has already been there. He has a mind that spans time and space, an eye for technical detail, and the hand of a great painter. His spectacular Space Station One, created for the film, "2001: a Space Odyssey," has become a collector's item and a contemporary classic.

Frequently commissioned by NASA to do on-the-spot paintings of America's ventures into space, McCall is always present for important launches and splashdowns. His oil paintings have gained international acclaim reproduced as U.S. Postage Stamps, one of which was the first stamp cancelled on the moon, and another, his most recent, commemorated the historic Apollo-Soyuz space rendezvous. McCall's work hangs in important museums, corporate offices and private collections around the world, and he has been honored in a one-man space art show at the Smithsonian Institution.

There is no question about it, Bob McCall is the premier space artist of this generation. Now offered for the first time, are three gallery-quality lithographs of McCall's work. These are incredibly detailed, beautifully colored paintings of Man's greatest journeys. Each 24 × 28 inch lithograph is accompanied by a descriptive statement in the artist's own words. The complete edition of all three unsigned lithographs can be acquired for a total of $18.00. A signed set of three (each one hand signed by the artist) is a total of $35.00. Prices include protective packaging. This limited collector's edition has been authorized by the artist and FUTURE Magazine guarantees your complete satisfaction.

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CLONES ON THE TUBE

Cloning and genetic engineering have been splashed across front pages worldwide—from the controversial report of an American millionaire's genetic duplicate to the documented birth of the first "test tube" baby girl in London. Now television masterminds are planning to do reality one better, with a veritable platoon of chemically created doubles slated to show up in pilot premieres this fall.

In the headlong rush to air the shows before public interest wanes, certain scientific advances have been telegraphed. In the case of the most-talked-about project, NBC's *The Clone Master*, the handsome biochemist hero worked some video magic to produce that unlikely science-fiction mainstay—the "instant adult" clone. The clone master (played by Art Hindle) managed to whip up 13 exact duplicates of himself in the space of a two-hour script.

The show's producer, Mel Ferber, was faced with the same problem occupying scientists the world over—how to make the clones. The problem was solved with a little help from the makeup department. Jack Young devised a "mobile mask" which conforms to the actor's face on the inside and looks just like Hindle on the outside, so the star and his baker's dozen of duplicates can appear on screen *en masse* without extensive special effects.

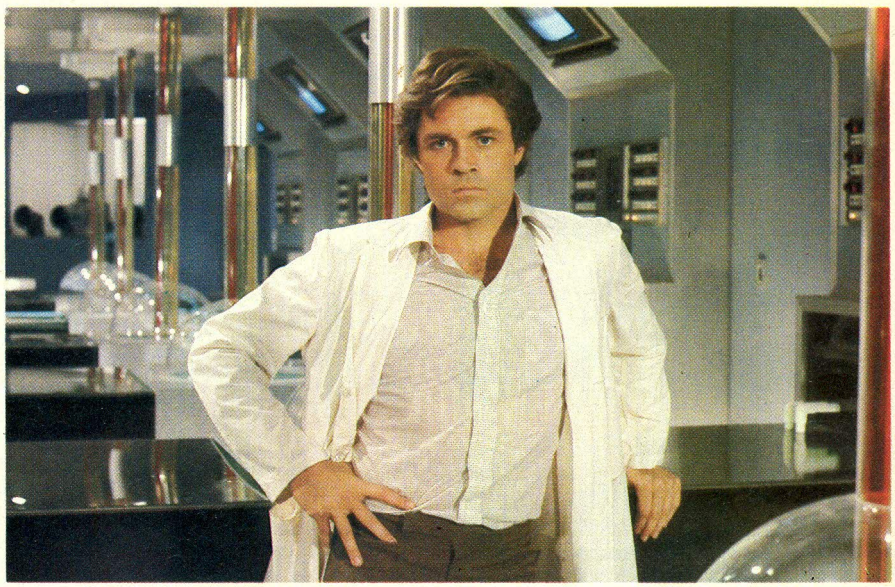


Photo © 1978 NBC-TV

One is not enough: Art Hindle as *The Clone Master* duplicates himself 13 times.

Another visual plus was the underground clone laboratory set—a 75-foot-long construction occupying Paramount's Stage 18. Extra futuristic atmosphere was supplied by locale shootings at the Rocketdyne division of Rockwell International, where the space shuttle is being built.

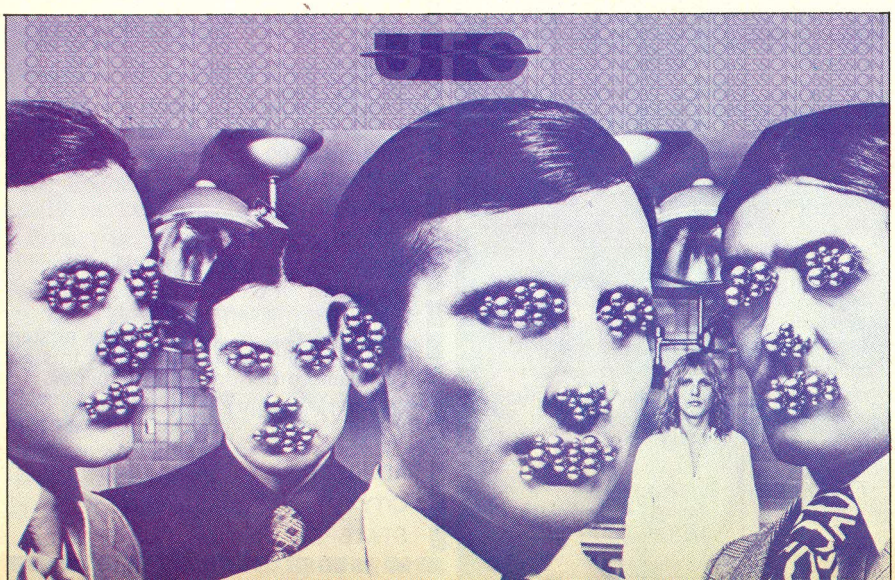
Another two-hour pilot, *Clones,* being prepared by CBS is described as a "psychological thriller." Hopefully, it will not duplicate the NBC effort.

Meanwhile, hopes are already high that *Clone Master* will become a regular series. The advantages of 14 look-alike heroes hasn't been lost on the show's writer, John D.F. Black, veteran of *Man from Atlantis* and *Star Trek,* who says, "We can kill the hero off and still continue the series." — *Richard Meyers*

UFO ROCK: INTO THE VOID

When art design studio Hipgnosis was asked to illustrate the cover of British rock band UFO's newest album, *Obsession,* its staff knew they had to come up with something especially bizarre. The Chrysalis Records band is infamous for its on- and offstage spaciness. In fact, when not crooning tunes concerning various stages of far-outness, UFO has been known to give rock concert promoters, writers and fans small seizures with a brand of behaviour that can only be termed Twilight Zone-ish.

For instance, when the futuristic heavy metal troupe was getting off the ground a few years back, they suddenly found themselves without a lead guitarist during a tour of Germany. In order to get through the scheduled list of dates, they "borrowed" the lead guitarist from their opening act. The guitarist, Michel Schenker, went over big with audiences and UFO decided not to give him back to the original band. The only problem was that Michel spoke no English. This didn't stop UFO, who counted Schenker a plus. ("Our previous guitarist wore baggy pants all the time.") After a few months with the group, Michel picked up the language and shortly thereafter, before an important U.S. tour, picked up and left UFO. A few months later the silent guitarist returned to the fold, never telling his peers where he had flown off to.



"He didn't actually say much when he came back," explains UFO founder-singer Phil Mogg. "Everybody's a little mad in UFO and Michel's definitely got his slot in there." Keeping UFO's bizarre lifestyle in mind, Hipgnosis came up with the accompanying artwork not exactly a Brave New World-inspired design, but something futuristic enough to resemble a scene from *Rollerball*-bearing. Believe it or not, the *Obsession* album is just as off-the-wall as the cover. — *Ed Naha*

WHO OWNS THE MOON?

For years visionaries have been arguing that we should plan to mine the Moon and the asteroids to increase the mineral resources available to humanity. Krafft Ehricke has described how nuclear explosives could be used to extract ores on airless worlds. More recently, space colony proponent Gerard O'Neill has advocated launching ores from the Moon to manufacturing facilities in space, which would make satellite solar power stations, space habitats and other products. These proposals have assumed that there would be no international obstacle to the extraction of minerals from the Moon and other bodies.

But the prospects for Moon mining may be set back by a draft treaty now under consideration in the United Nations Outer Space Committee. If approved and ratified by U.N. members, the treaty would establish a special international legal regime governing human activities on the Moon.

The treaty would make the Moon and its natural resources the common heritage of "Mankind," and would prevent any government organization or person from owning any part of the Moon's surface or subsurface, or any of the Moon's natural resources in place.

The treaty would call on governments "to prevent the disruption of the existing balance" of the Moon's environment by adverse changes or contamination. It would make national administrations responsible for the activities on the Moon of private companies and individuals under their jurisdiction. And it would require that all space vehicles, equipment, facilities, stations and installations on the Moon be open to inspection by other nations.

These provisions could cause problems for private companies that might want to mine and ship lunar minerals at some time in the future. They could even be an obstacle to governments, since Moon mining might be considered disruptive of the Moon's environment.

The treaty would apply not only to the Moon, but to all other bodies in the solar system (except the Earth) unless separate legal arrangements were made for them. Asteroid miners might not be allowed to break up those flying mountains into ore, or to tow them into the Earth-Moon system as Princeton physicist Brian O'Leary has proposed. The ban on disrupting the environment could prevent the terraforming of Mars (which might be accomplished by vaporizing the ice caps) or Venus (perhaps by using algae to consume the atmospheric carbon dioxide that caused that planet's heat death).

The U.N. Outer Space Committee discussed the draft Moon treaty, along with other issues, at its annual meeting in late June and early July. While no formal action was taken, there was general agreement on the draft prepared by Austria. If the treaty is signed by the U.S. representative to the Outer Space Committee next summer, it would be submitted to Congress for approval.

— Michael A.G. Michaud

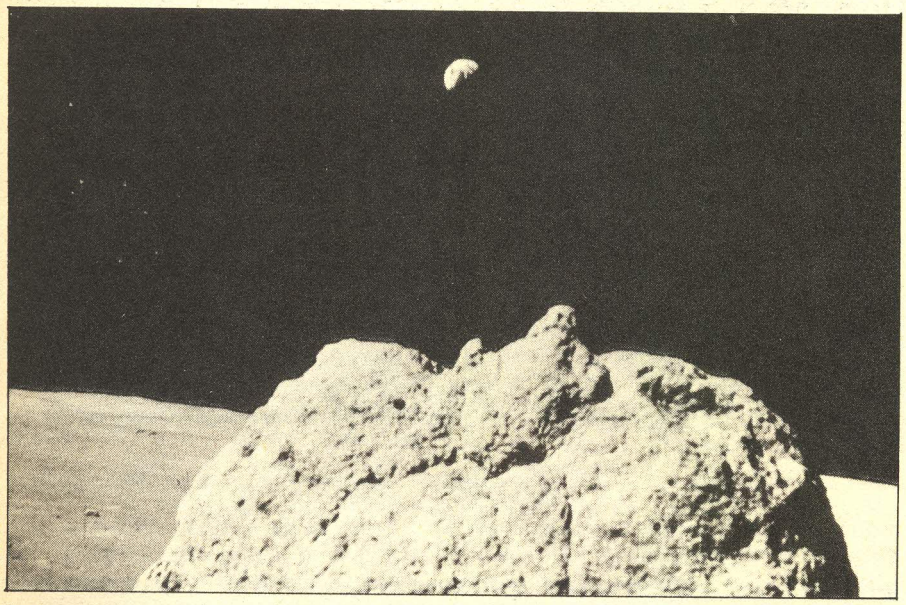


Photo: NASA

Lunar boulder (with half-Earth) as photographed by Apollo 17 crew in the Taurus Littrow region of the Moon: Will U.N. treaties ban Moon-mining?

HOW MANY MEGAWATTS IN A VOLCANO?

Hawaiian energy researchers will soon begin tapping power from one of the islands' oldest and most unique natural assets—volcanoes. Joining in the current rush for clean alternative power sources, Hawaiian officials predict that volcanic geothermal energy will lead the state toward energy self-sufficiency (apart from jet fuel) by 1990.

At a site near Hilo on the island of Hawaii, a 6,450-foot well has been drilled which will draw steam and hot water up from Kilauea Volcano, one of the two still-active volcanoes on the Big Island. Below 4,100 feet, the water temperature is above 570 degrees F. Under pressure, such hot water flashes into steam which can be harnessed to power a turbine generator.

The first power unit will likely be primarily funded by the U.S. Department of Energy. The plan calls for installation next year of a turbine using steam at 150 lbs. per square inch to generate three megawatts, a cooling tower, a small electric substation and a visitor center. From this site alone, optimists hope to extract 10 times the local power demand, thereby making the area attractive to industry.

The idea of geothermal wells is by no means a new one. Reykjavik, Iceland, has been utilizing subterranean steam for years to heat municipal buildings and many private homes. In fact, a little village in Italy began producing steam-generated electricity at the turn of the century. But Hawaii's is the first geothermal project on such an ambitious scale.

Aided by laser ranging measurements, the Hawaii Volcano Observatory of the U.S. Geological Survey will be busy diagnosing when and where steamy eruptions will occur. It is therefore envisioned that volcanic power plants may actually consist of portable modules. Not ones to be left out of energy schemes, oil companies are seeking promising sites elsewhere. The Atlantic Richfield Co. has taken out lease options on 322,000 acres, and 11 drill permits have been issued.

The project sounds good enough to be endorsed even by Madame Pele, the Hawaiian goddess of volcanoes. As attractive as it seems though, one aspect of the plan really stinks — literally. As is typical of many geothermal wells, this one produces a nasally offensive hydrogen sulfide gas, in addition to an ear-shattering roar, leading to opposition from local residents. However, once the well is hooked to the turbine, the engineers hope to alleviate the problem. — *Bob Woods*

Art: Howard Cruse

KANSAS ENTREPRENEUR RUNS COMPUTER EMPORIUM

"People have been playing computer games for years in colleges and businesses," says Douglas Pratt, "but we are the first to make these kinds of games available to the general public in a user-oriented fashion. That means you don't need any prior experience with a computer to play."

Doug Pratt is talking about his brainchild, Cyborg, Inc., which he says is the country's first computer gaming center. And he's not talking about Pong.

Last December he set up six sophisticated microcomputers in what he calls a "pleasant, den-like atmosphere." Then he filled the computer memories with games, and charged $ 5 an hour to play. It caught on so fast that Cyborg recently moved to a larger store and added 2 computers. Now Pratt is franchising the Cyborg concept — including the programs he's written.

What makes Cyborg such an attraction with a public that usually finds computers either boring or threatening? "We don't sell computers and we don't sell programs," Pratt says. "All we do is play games — strategy games, simulation games . . . We teach programming and we sell time on the computers.

"The Cyborg concept is for serious people. There are enough noisy pinball arcades in the country. Computer games are a step up from pinball or video games. They offer more challenge and invite more interest. Our clientele ranges from an eight year old who is writing his own programs to an elderly couple who regularly take each other on at 'Space Pirates.' "

So far the store is mainly game oriented, but Pratt is confident that Cyborg will be more. He has programs to chart biorythms, print pictures and calendars, maintain mailing lists, manage the family budget, balance a bank account and practically do the taxes. He's even got a program to answer those irritating computer letters — with an equally irritating reply from *your* computer.

Most people come to Cyborg to play, but they're finding out, as Doug Pratt says, "Computers are the most versatile tool humanity has created. They are not intimidating or awe-inspiring. They are useful and fun. And *anyone* can use them." — *Richard Meyers*

Doug Pratt says computers are just for fun.

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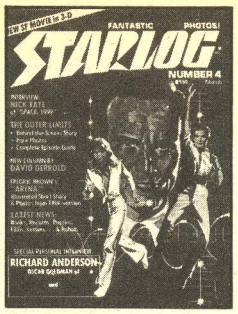

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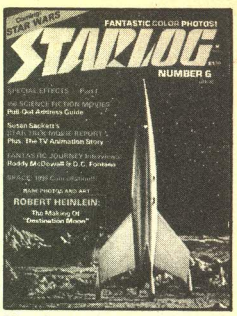

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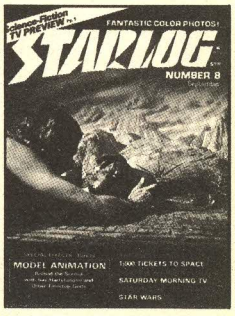

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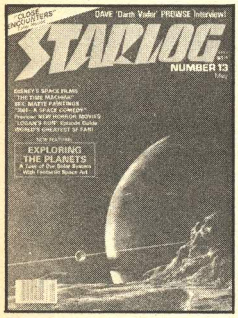

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PAPERBACK AVALANCHE DUE

The best evidence of the science-fiction boom—and one of the most pleasant side effects—is the current flood of new SF paperbacks due to hit bookstores this fall.

From Ace Books comes a Larry Niven original, *The Magic Goes Away,* the sad tale of magician Orolandes—a man in search of his lost power. Also on hand from Ace: Alexei and Cory Panshin's *Earth Magic* (faraway fantasy); Steve Wilson's *The Lost Traveller* (SF motorcycle epic); Arsen Darnay's *The Seige of Faltara* (futuristic camel jockies fight for freedom); John Bellairs' *The Face In The Frost* (wizardry galore); Harry Harrison's *Skyfall* (a cataclysmic Chicken Little tale); J. Michael Reaves' *I—Alien* (a stranded traveler from "out there"); Gordon R. Dickson's *Pro* (intergalactic adventure); Ben Bova's *Star Watchman* (cosmic conquest); E.E. "Doc" Smith's idea, *Lord Tedric,* continued in literary form by Gordon Ecklund and Robert Sheckley's *Immortality, INC.*

From Dell comes the first of its "Binary Star" series, two novels in one volume—Fritz Leiber's *Destiny Times Three* and Norman Spinrad's *Riding The Torch.* Also from Dell: Ben Bova's *As On A Darkling Plain* (interplanetary suspense); Philip K. Dick's *The Zap Gun* (paranoia, future tense); Greg Benford's *In The Ocean Of Night* and Lin Carter's *Renegade Of Callisto* (the eighth sword and sorcery novel of the *Jander* series).

Not to be outdone is Bantam with *Star Trek* Fotonovels 10, 11 and 12 making an appearance: *Day Of The Dove, The Deadly Years* and *Amok Time.* Backing up these releases are Gordon Eklund's *The Starless World,* Ann McCaffrey's *Dragonsinger* (more high-flying SF fantasy), L. Sprague deCamp and Lin Carter's *Conan The Swordsman #1* (everyone's favorite muscleman), Ursula K. LeGuin's anthology *Nebula Award Stories Eleven* and Kathleen Sky's *Vulcan* (a little boost for the *Star Trek* fans).

Ballantine will bring forth gasps of wonderment from SF fans worldwide with beautifully illustrated trade paperbacks

New Larry Niven novel from Ace Books is oversized with illustrations inside.

now on the way, including the fourth volume of *Ariel: The Book of Fantasy. The Hobbit: An Illustrated Edition* resurrects the illustrations used on last season's TV special; *Fantasy Masters: A Journey Into Dreams* presents ten masterful tales of fantasy fiction by everyone from Michael Moorcock to Robert E. Howard; *Art Of The Brothers Hildebrandt* presents the first collection of fantasy art by the best-known interpreters of Tolkien, *New Romantic Art: Dreams, Visions and Fantasies* is a visual exploration of phantasmagoria, and *The Atlas Of Fantasy* by Jeremy Post maps fantastic realms from Utopia to Middle Earth.

Del Rey is betting on a good combination of SF and fantasy to woo readers with offerings such as Patricia McKillip's *Heir of Sea And Fire* (a sequel to *The Riddle Master Of Hed*), Robert Hoskins' *To Escape The Stars* (a soldier-of-fortune epic set in space), Cordwainer Smith's *Norstrilia* (the richest man in the galaxy has a fling), Howard Waldrop and Jake Saunder's *The Texas-Israeli War: 1999,* Evangeline Walton's *Prince Of Annwn* (first of four fantasy volumes), Jack Chalker's *Exiles At The Well Of Souls* (sequel to *Midnight At The Well of Souls*), Arthur C. Clarke's *The View From Serendip* (a collection of essays), Robert Heinlein's classic *Space Cadet*, Fred Pohl's *The World Has Gone Mad, The Best Of Lester Del Rey* (with an intro by Pohl), H. Rider Haggard's *She* and *Ayesha: The Return Of She* (vintage immortality), Martin Caidin's *Cyborg* (from whence evolved *The Six Million Dollar Man*), *The Best Of Raymond Z. Gallun*, Poul Anderson's *A Midsummer Tempest* (a Shakespearean world in the flesh), Alan Dean Foster's *Dark Star* (like the movie), *The Best Of Eric Frank Russell* and Clifford D. Simak's *Mastodonia* (a tale of time-travel terror).

And that's only the tip of the "eyeberg" for devoted readers. The titles for the fall-winter outburst promise to be equally as staggering. Clearly, if publishers have their way, all science-fiction fans in the future will be born with compound eyes.

— Joseph Kay

E = MC² = HI IQ?

The brain that came up with the calculation E = MC² and completely revolutionized the world's understanding of the universe is currently residing in a jar placed securely in a cardboard box in a tiny laboratory in Wichita, Kansas. The brain of Albert Einstein is now the property of Dr. Thomas Harvey, former chief pathologist at Princeton University. He performed the autopsy on Einstein on April 17, 1955, and at the request of Einstein's family, removed the brain for study.

Nearing death, Einstein, who died in Princeton Hospital of an aneurism at the age of 76, requested that his brain be left to science for careful scrutiny because "my brain is my laboratory." Since that time Dr. Harvey has supervised the work of

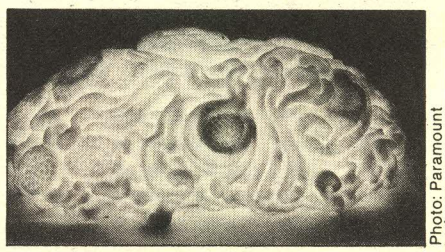


Photo: Paramount

From *The Space Children,* released in 58.

various groups of scientists who have studied and dissected parts of the genius' brain in an attempt to discover if there is any *biological* reason for Olympian IQ. Harvey, thus far, has not revealed any findings in his biological search for the roots of genius but has revealed that he may publish the results of his experiments in 1979 . . . Einstein's 100th birthday.

— Ed Naha

CRIPPLED GIRL GETS BIONIC HAND

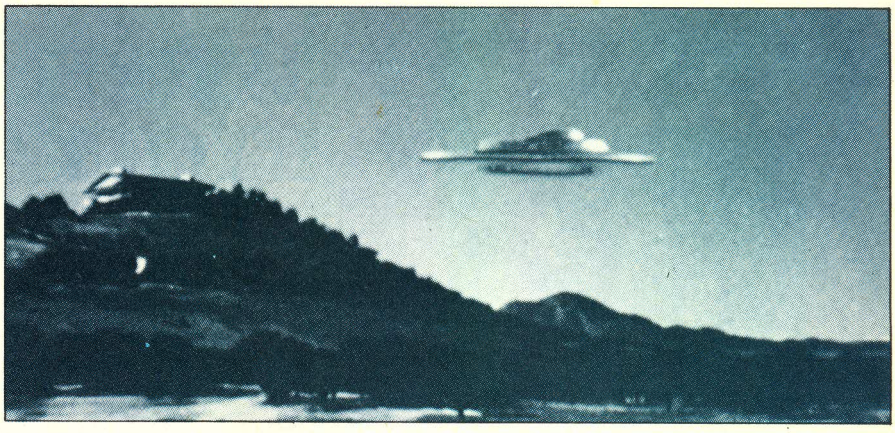
Science fact has melded with science fiction in the north of London, producing truly miraculous results for three-year-old Joanne Brennan. Joanne was born without a right hand but these days she is happily stringing beads and skipping rope like a pro — thanks to an artificial hand developed by Swedish surgeon Dr. Rold Sorbye. Joanne's parents, upon learning of the existence of this medical breakthrough, joined with concerned neighbors in raising the $5400 needed to cover the cost of the bionic transplant. In Sweden last spring, Joanne was fitted for her new hand by Sorbye. Today, that hand is totally functional, operated by signals from Joanne's brain picked up and interpreted by electrodes. *— Josephine Weiner*

UFOs GAINING IN THE POLLS

With all the talk about extraterrestrial life and possible contact by same—spurred by *Close Encounters of the Third Kind, Project UFO* and other media inventions of that ilk—how are unidentified flying objects and alien intelligences faring in American public opinion?

According to a recent Gallup Poll, much better, thank you. A solid majority of Americans believe UFOs are real and not imaginary. Compared to earlier Gallup surveys, belief in the phenomenon is growing steadily.

The nationwide survey asked: "In your opinion, are UFOs something real or just people's imagination?" A resounding 57 percent voted "real," only 27 percent said "imaginary" and 16 percent answered "not sure." In 1973, results were 54 percent "real," 30 percent "imaginary," 16 percent not sure. In 1966, only 46 percent voted "real," 29 percent opted for "imaginary" and a hefty 25 percent said they weren't sure. Apparently the "not sures" are coming over.



This Island Earth, courtesy Universal Pictures.

The upswing in UFO believability coincides with an increased willingness to entertain the idea that intelligent life may exist on other planets in the universe. Another 1978 Gallup Poll asked: "Do you think there are people somewhat like ourselves living on other planets in the universe?" The affirmatives had it by a slight majority: 51 percent. Another 33 percent said no, and 16 percent said they were not sure. By contrast, in 1966 only 34 percent of the public entertained the notion of such possibilities, while 46 percent said they thought not and 20 percent answered not sure.

It will be interesting to read the results of the first Gallup Poll survey on these topics *after* the first substantiated proof of extraterrestrial life . . . either from NASA's radio telescope Search for Extra Terrestrial Intelligence (SETI) or some other irrefutable evidence. It's doubtful, even then, that Gallup will come up with 100 percent believers — *Leonard David*

Announcing

A PREMIERE EVENT
EVERYONE WHO ENJOYS

The SpaceArt Club

A Division of FUTURE Magazine

Here's how The SPACE ART Club works:

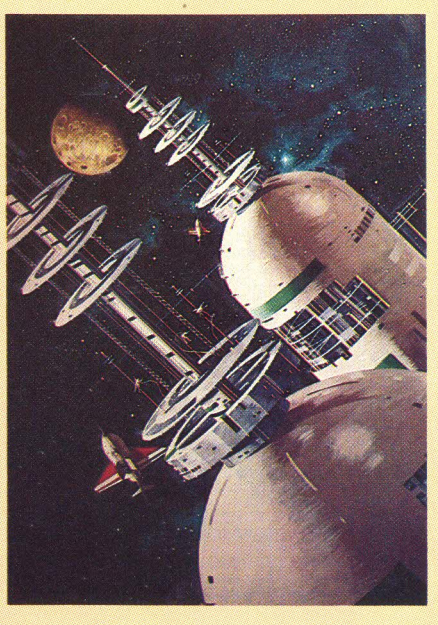
1. EIGHT ART PRINTS — Eight times during the next year a new edition fine-art print will be issued (the same day each issue of FUTURE Magazine is published). Each edition will be limited to 5,000 prints. Each print will be announced and pictured in FUTURE, and if Club members do not reserve all 5,000, the remaining prints will be offered to readers at $10.00 each, plus postage and packing.

2. HIGHEST QUALITY — Each fine-art print will be a major painting by one of the world's greatest astronomical artists. The editors of FUTURE, together with the artists themselves, will select the paintings. Most will be exclusively created for this project and none will be available anywhere else. Each print will be reproduced in full-color on highest quality rich, textured paper (approximately 18″x24″ with white border). Truly a luxurious piece of art — ready for framing!

3. THE ARTISTS — The complete set of eight will include a variety of space scenes: planetary landscapes, cosmic vistas, imaginary wonders, and futuristic hardware. The artists are the masters of the field: Bob McCall, John Berkey, Ludek Pesek, Syd Mead, Adolf Schaller, Ron Miller, Don Davis and Vincent diFate. Virtually the Hall of Fame in space art, this incredible group represents a staggering collection of artistic techniques and scientific imagination.

4. 50% SAVINGS — By joining The SPACE ART Club for one year, you will automatically receive each print as it is

Famed European artist Ludek Pesek has been honored at exhibits around the world and in publications like *National Geographic*. For the Club he will render a spectacular Martian duststorm.



Paintings by Vincent diFate, such as this one, have adorned the covers of SF magazines and books for years, but the artist has created one of his most inspiring works for the Club.

DEADLINE: December 15, 1978
FIRST EDITION: December 19, 1978
All Club membership applications (with payment) must be received in our offices by December 15, 1978. After that date, money will be returned.
Each edition thereafter will be issued coinciding with the publication dates of FUTURE Magazine — 8 editions per year.

GUARANTEE: FUTURE Magazine guarantees each of these prints to be highest quality reproduction, exclusive availability, and absolutely limited to a printing of 5,000 numbers. If you are not completely delighted with the beauty and quality of the first edition, you can return it within 7 days for a complete refund.

OF IMPORTANCE TO FINE SPACE ART

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— a rare opportunity for you to own limited edition fine art prints at an unbelievable

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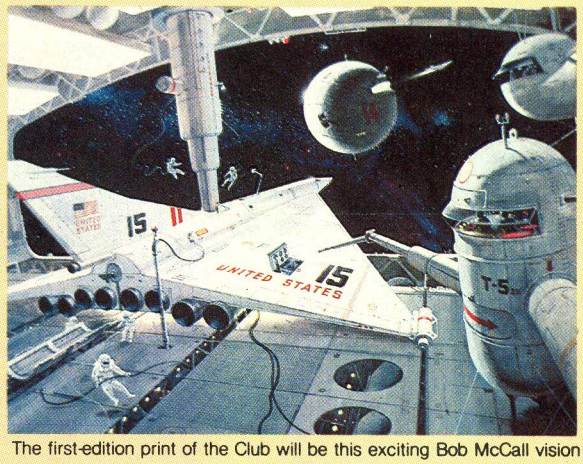

The first-edition print of the Club will be this exciting Bob McCall vision.

issued (mailed tubed with protective tissue) — that's 8 fine-art prints during the next year, an $80.00 value — but here's the best part: Club members pay only $40.00 for the complete set, a 50% savings! And that includes all postage and mailing charges (an additional savings of $16.00).

5. STRICTLY LIMITED — Club reservations will be filled first, and remaining prints (if any) will be offered to non-members on a first-come/first-served basis. When the limited supply is gone — that's it! This plan assures the long-range value of these special collector's items. The complete set represents an excellent art investment for the future.

6. DELUXE SIGNATURE SETS — For collectors who are able to make the investment, The SPACE ART Club is offering a special membership in which each edition is hand-signed and numbered by the artist (earliest orders will receive lowest numbers). Imagine — a set of limited edition fine art prints, actually signed by the greatest space artists of the world. Signature prints are available only to Club members (no signed singles) at $20.00 each — $160.00 for the year. The DeLuxe Signature Set is sure to be the most valuable in future years.

7. ORDER TODAY: Final deadline for Club membership is December 15, 1978. Absolutely no memberships will be accepted after that point (we must determine how many non-member prints will be available for sale and if memberships amount to 5,000, no single prints will be offered). We suggest that you rush your order now!

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(If you want more than one membership or if you do not want to cut up this page, send order on separate paper.)

LIVING WITH THE DRAGONS

Anne McCaffrey

Art: courtesy Del Rey Books

Michael Whelan's imaginative cover for Anne McCaffrey's newest, *The White Dragon.*

By ED NAHA

F'lar knew that the men reveled as much as he did in the fierce joy of riding a flaming dragon; the fumes of phosphine were exhilarating in their own way, and the feeling of power that surged through the man who controlled the might and majesty of a dragon had no parallel in human experience. Dragonriders were forever men apart . . . And to ride a fighting dragon, blue, green, brown or bronze, was worth the risks, the unending alertness, the isolation from the rest of mankind." — from *Dragonflight*

"I'm just an Irish storyteller," says Anne McCaffrey chuckling. "Back home in Ireland I'm known as the 'crazy American who keeps the horses!' " To her neighbors on the Emerald Isle, McCaffrey may be regarded as a horse keeper but, to millions of readers across the globe, she is better known as a dragon maker; the author responsible for unleashing the fire-breathing dragons of Pern. In the last decade, Anne has set the imaginations of countless SF enthusiasts afire with her Dragonrider novels; the immensely popular *Dragonflight, Dragonquest* and this year's *The White Dragon*. The good-humored author is somewhat awed by the success of her winged protagonists. "*Dragonflight* started out as a short story," she confesses. "48,000 words later I still hadn't stopped. And now I'm not allowed to. They want *more* dragon stories."

McCaffrey underplays her success good naturedly. "And I love writing about the dragons. It's almost too much fun to be called work!"

Stopping in New York on a rare visit Stateside, the kinetic, cheerful woman appears to be the antithesis of today's quintessential science-fiction writer. In an SF realm bristling with press conferences, large gatherings, college tours, media events and rampant editorializing, McCaffrey quietly defies convention by leading a fairly pastoral life in Ireland — surrounded by her work, her family and her horses. For McCaffrey, the atypical is to be expected. Since childhood, she has reveled in a stubborn streak of independence that, eventually, led to her becoming a science-fiction author and a conjurer of fiery dragons.

Born in Cambridge, Massachusetts, the daughter of a Commerce Bureau research-

Ignoring the rules that said SF was a macho world she wrote her way to the top — tossing off tales of dragons, dinosaurs and spacefaring heroines along the way.

er and a mother with an insatiable hunger for knowledge ("My mother started going to college when we were growing up because she hadn't gotten the chance when she was young."), McCaffrey always *knew* she was destined for a fairly unique lifestyle. "I was brought up being told 'Anne, you're going to get married and have children . . . Then what are you going to do with your life?'It never occurred to me that I would ever be *just* a *housewife*!

"It was also obvious that, from the age of eight or nine, I was going to be a writer. I'd sit behind the family typewriter and, through the hunt-and-peck system, come up with some marvelous stories." McCaffrey's earliest creations included tales of dancing slave girls and stalwart heroes. She also dabbled in fantasy-laden playwriting at Girl Scout camp in an effort to entertain the troops, so to speak. "I did one fairy tale for the entire camp. I was the writer, the director and the *star* . . . of course."

A voracious reader, Anne was encouraged in her literary pursuits by her parents who, inadvertantly, sowed the seeds of her future career. "Mother introduced me to the *Ship of Ishtar* by A. Merritt," says McCaffrey, reliving her original sense of awe. "I absolutely *freaked out!* It was so *grrreatt!* So marvelous! Then I discovered Edgar Rice Burroughs, his *Tarzan* and *John Carter of Mars* stories. When I was about 14, I discovered *Islandia*. I think that of all the books I read, it had the most profound effect on me."

With visions of space flights and Utopias swimming in her mind, McCaffrey continued to nurture a growing interest in science fiction — an interest that was not at all common for a young girl growing up in the 1940s. Science fiction was a boy's turf and Anne found herself unable to share her feelings with her fellow female classmates. "I didn't know science-fiction fandom existed when I was a teenager," she says wistfully. "God, I wish I had. I wouldn't have been so lonely. I was a brat. Oh lord, in spades. When I think of how repulsive I was in my teens, I quiver. I was always *right*. I was *not* a *jerk*. If those other girls didn't want me to join their silly sorority, I didn't care. (Of course I was terribly hurt.) I was brought up not to conform. I developed my own way."

Anne's secret love of science fiction and writing lasted through college and into marriage. Writing in her spare time, the struggling McCaffrey found it difficult to put all her thoughts on paper smoothly. She took a job as a copywriter and, using this job as a touchstone with the mechanics of literature, began sending out her first tales. "I had rejection slip after rejection slip," she giggles. "I could have papered a wall with them! It was a little discouraging. Then, in 1950, I was sick with bronchitis, which is my usual winter sport. I started reading a lot of current science-fiction magazines and I came across Edmund Hamilton's *Star Kings*. I put the magazine down. That's what I wanted to do. Fantastic! Great! I had never read anything like this before. I wanted it!"

Photo: courtesy Del Rey Books

Anne McCaffrey: the 'crazy American'.

Anne shakes her head ruefully recalling that day. "It was like a drug. I couldn't keep my hands off science fiction. And my husband, a Princeton English major, was having canaries about it. What was I doing reading this *trash?* Then I started to try to write science fiction. In 1954 I wrote a short story that Sam Moskowitz picked up for *Science Fiction Plus*. That was my first published story. What a thrill it was. I had a young baby at home, but *this* production was almost more important."

At this point, however, Anne's desire for a writing career was put to a test. A housewife and a mother, she continued to pen science fiction in whatever free time she could manage. She did not actually sell another story until 1959. During this lean period she penned a second piece which would emerge, in 1961, as *The Ship Who Sang* — a novel about a rocketship with the mind of a woman. "It was written to ease my grief at my father's death," Anne explains. "He had picked up tuberculosis in Korea. He was only 63 when he died. Gee, I wish he could have seen the book. Well, maybe he wouldn't have liked it. He was a Harvard Ph.D. Ha! His daughter writing *that* stuff? Well, I'm sure father would have approved of my being one of the tops in the field."

Anne then began seriously to consider a career in science-fiction storytelling as a full-time occupation — one that was still quite unique for a woman writer. Only a handful of female authors had established themselves in the field at that time and, of those, several had achieved fame using fairly asexual pseudonyms. McCaffrey, however, somewhat naive as to the politics of publishing, never even considered sexism a factor. "No one told me that I couldn't write science fiction because I was a woman," she shrugs. "Besides, if they had told me that I would have said, 'Buzz off, I'm going to do it anyway. Who do you think *you* are, keeping me from what I want to do.'

"Actually, I received cooperation and help from all the editors and writers. As a matter of fact, in 1963, I was about to throw it all in. I couldn't get anywhere. I couldn't write a story that would sell. Jim Blish, bless his heart, said, 'Anne, what happened? You started off with three marvelous stories. What happened?' I went off and thought to myself, 'If James Blish thinks I've got something, then maybe I've got to look a little harder for it.' And I did. And it paid off in spades.

"People were always trying to get me through the rough spots. One day Bob Silverberg took me aside and said, 'Anne, will you cut it with the adverbs?' Jim Blish gave me advice, too. 'Anne, there is a wonderful word in the English language. It is called *said*. You don't need to use any other one when you're describing a conversation.' Every once in a while I feel a tap on my shoulder when I'm writing. If it's on the left, it's Jim. If it's on the right, it's Robert. They keep me on the straight-and-narrow path."

With encouragement from her peers, Anne began writing furiously. Eventually, she turned to full-time storytelling and unleashed a novel which immediately raised a storm of controversy in SF circles. "In 1965," McCaffrey says, "we moved

(continued on page 74)

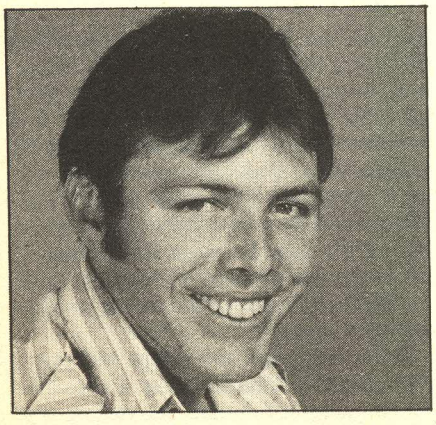
What do you foresee as Earth's next great energy source?

Future Forum is designed to expose our readers to the thoughts of a variety of experts in the fields of science fact and science fiction. Each issue will pose a new question to our "guest panel" on a particular aspect of SF, space-age technology or future trends.

Joanna Russ:

Author of **Picnic On Paradise, The Two Of Them** and **Chaos Died.**

It will have to be a combination of solar energy, some nuclear energy, tidal energy, wind energy — we haven't begun to tap all the sources, since fossil fuels have (until now) been so easy and so cheap. Nuclear energy alone strikes me as highly dangerous, and much more expensive than the others. It's being touted because the capital investment is so high and therefore a lot of money can be made from it.



John Bryson:

Director, U.S. UFO Research Laboratories, Inc.

I would think the most promising thing being developed today is solar energy. A local mining research firm in the southwest has developed a way of grinding stainless steel and mixing it with the silicon base, producing the solar panels. Prior solar science poured the silicon onto a stainless steel base, which in part made the process very expensive. This new process can be produced for around 75¢ a square foot. In one of the current tests being performed, the solar panels (100 square ft.) are running a well pump. The panels produce so much power that they keep burning out the transformers. The key here may be in gauging the transformer from one step up to a series of steps keyed to the cycle wavelength at the base receiver. The true answer to our energy problems may lie just beneath the surface of this new science.

David Gerrold:

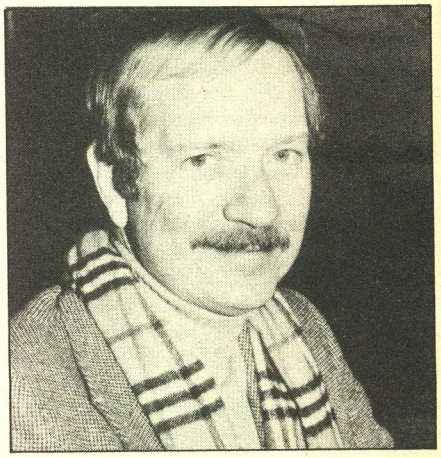
SF author and columnist, best known for **The Man Who Folded Himself, "The Trouble With Tribbles"** and his newest novel, **Deathbeast.**

The next great energy source will be the ingenuity of the human mind. Everything else is bookkeeping.

Poul Anderson:

Hugo and Nebula award winner, author of **Tau Zero, Three Hearts And Three Lions** and **No World Of Their Own.**

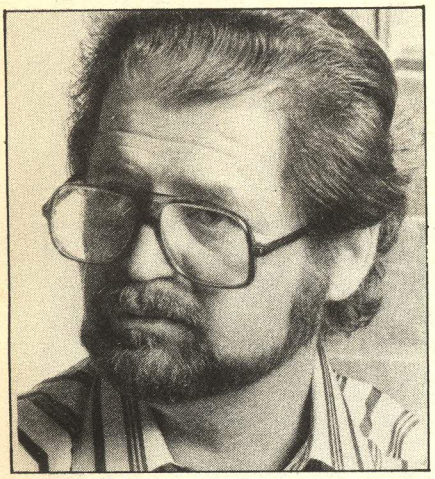
This depends on a lot of factors, many of them political or otherwise non-technological. For some purposes, fusion energy will be essential, but as presently being developed it has many drawbacks, including at least as much pollution as fission (though less than coal, of course). Orbiting solar collectors look the most hopeful for powering electrical transmission grids. Conversion of plants, probably genetically engineered for the purpose, into fuel alcohol also seems very promising. Temperature differentials in the oceans could theoretically supply all our needs, and the minerals incidentally brought up would support a lot of edible sea life.



Gahan Wilson:

World-renowned cartoonist, author of **And Then We'll Get Him** and **I Paint What I See.**

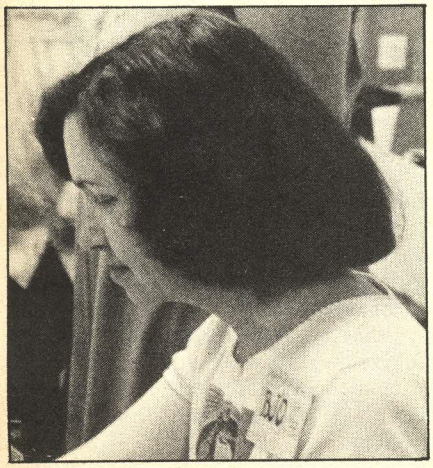
Slavery.



Larry Niven:

Author of **World of Ptavvs, Neutron Star, Ringworld, The Shape Of Space** and **All The Myriad Ways**; co-author of **Lucifer's Hammer.**

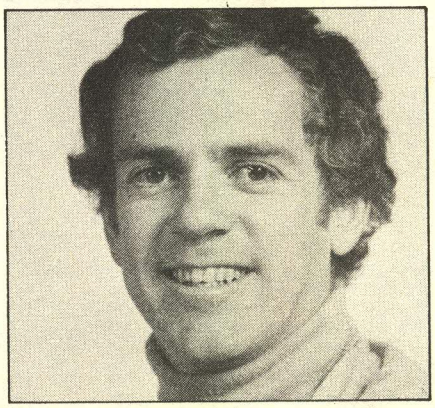
If the self-styled ecologists don't get out of our way, it'll be muscle power. Otherwise, breeder reactors and/or orbiting solar power plants. (But even ocean thermal plants are pollution-free. The only side effect would be to stir up the bottom, thus breeding more fish.)



Bjo Trimble:

SF artist, fan, writer and editor. Author of **The Star Trek Concordance.**

Well, one could *hope* it would be solar power, but I have my doubts unless we can channel some profit into it so the Big Oil concerns can make their millions off us. Otherwise I don't see any energy answers coming into public use until they have sold off all possible oil and petroleum sources and drained our natural energy sources dry. Cynical? Yes. But I challenge anyone to show me differently! I would suspect that we will make use of a great many other schemes and ideas for energy sources before we get our space program good enough to spread out sails (or whatever) for solar energy. Right now our methods for capturing and storing solar energy are too limited for the expense and certainly too chancy for use on a large scale. Certainly solar energy has a future; how soon we get it will depends on how profitable it can become for said Large Concerns mentioned previously.



Brian O'Leary:

Scientist, author and former astronaut, O'Leary is presently on the faculty in the physics department at Princeton University.

Satellite solar power stations created from minerals mined on the Moon and asteroids and then processed in space.

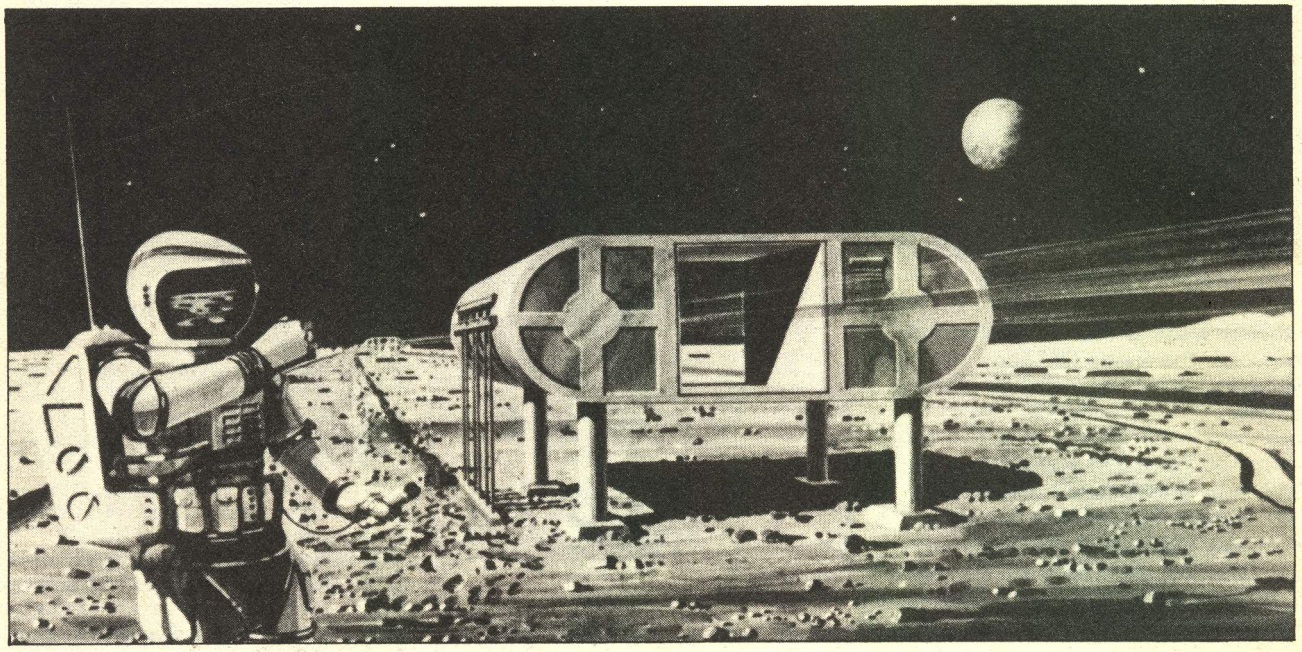
Marion Zimmer Bradley:

SF author, originator of the Darkover series. Her novels include **The Sword of Aldones, Darkover Landfall** and **The Planet Savers.**

Solar energy, I hope. Neutron bombs, I *fear.*

The Mass Driver

A Penny-Pinching Propulsion System for Future Space Projects



A lunar mass-driver could launch millions of tons of Moon soil to be processed into materials for building in space.

By ROBIN SNELSON

Professor Gerry O'Neill and his physics students did not invent space colonies. What they started doing in 1969—and what many of them are still working on—are the calculations which say space colonies can be built. Nine years later, the numbers are quite a bit different and the concept has evolved considerably, but the calculations still say "yes." In NASA terminology, there are "no showstoppers," no fatal flaws in the figures or technological impossibilities standing in the way. But that doesn't mean they're going to start building giant habitats in space next year.

O'Neill's concept is a unique synthesis of present and almost-present technology. It begins with the space shuttle, which is scheduled for its first orbital flights in 1979. That's only a small beginning, because the space shuttle isn't equipped to ferry up all the component parts of a million-ton space colony. How will space builders get their materials to the orbital construction site?

O'Neill's plan is to launch millions of tons of raw materials off the surface of the Moon. To make it easy, he thought up a revolutionary launching system which he named the "mass-driver."

The mass-driver is a new twist on an old idea. It draws on years of technology research which was done for an entirely different purpose.

Scientists and engineers have been working out the principles of electromagnetic propulsion to run high-speed trains, magnetically levitated to float above guideway tracks, for some time now. Such trains, which ride a surge of electromagnetic impulses in much the same way as a surfer rides an ocean wave, are currently under development in Japan and Germany.

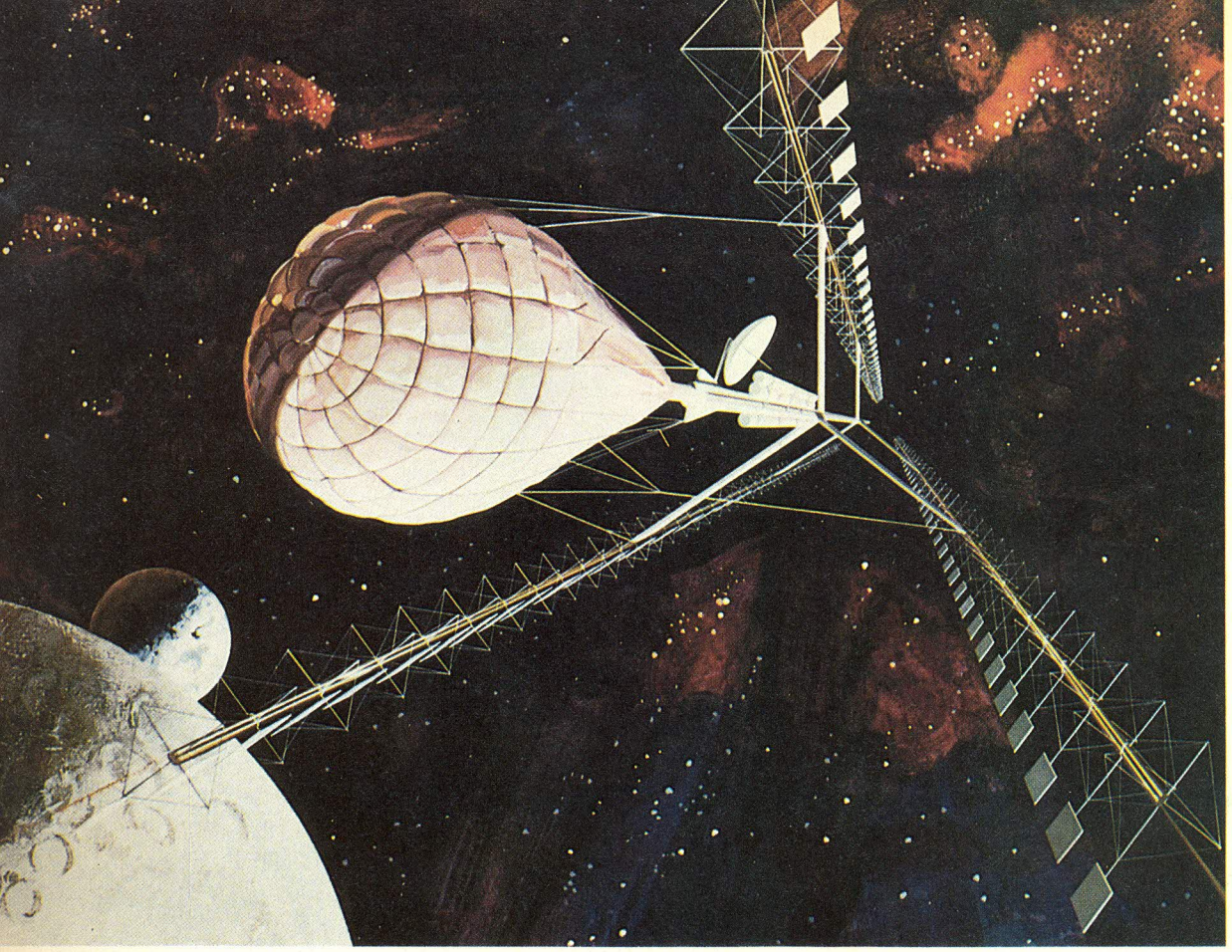
O'Neill figures the same principle can be used to fling loads of rocks and dirt from the Moon out into space, where they could be processed into the building materials for a space colony. But instead of setting up a launching ramp to hurl pre-packed "buckets" off the surface of the Moon, he was struck with an ingenious, money-saving plan: why not set up a giant recirculating loop that would return the empty buckets to be used over and over, and launch *only* the payloads of lunar soil?

It would be a tricky design problem. First, the buckets and their contents would have to accelerate to at least 2.4 km per second, fast enough to escape the gravity of the Moon, and certainly faster than any Earth-based train ever need go. Second, the aim would have to be very precise to deliver the soil to its final destination—a "mass-catcher" hovering in space 60,000 miles away. Once they're empty, the speeding buckets would have to be gracefully slowed down so they could cruise back along the loop to the lunar loading dock in recirculating, conveyor-belt fashion.

The beauty of the mass-driver as a lunar launcher is that it is *completely* reusable—no throwaway parts—and it runs on solar electricity, easily available on the Moon.

O'Neill is confident that it will work. And the experts, notably his principal coworker on the mass-driver's development, Dr. Henry Kolm of the Massachusetts Institute of Technology, agree. Everyone also maintains that there's plenty of hard engineering to be done between now and the time when mass-drivers will shoot

(continued on page 52)



Spacefaring mass-driver gets a gravity assist from the Moon on its way to factory in orbit. The big bag holds an asteroid, which will be mined for carbon, water and other useful elements.

A small factory in low-Earth orbit could recycle shuttle fuel tanks (cylinder-shape) into reaction mass to power space tug mass-drivers for moving lunar base components to the Moon.

Art: NASA

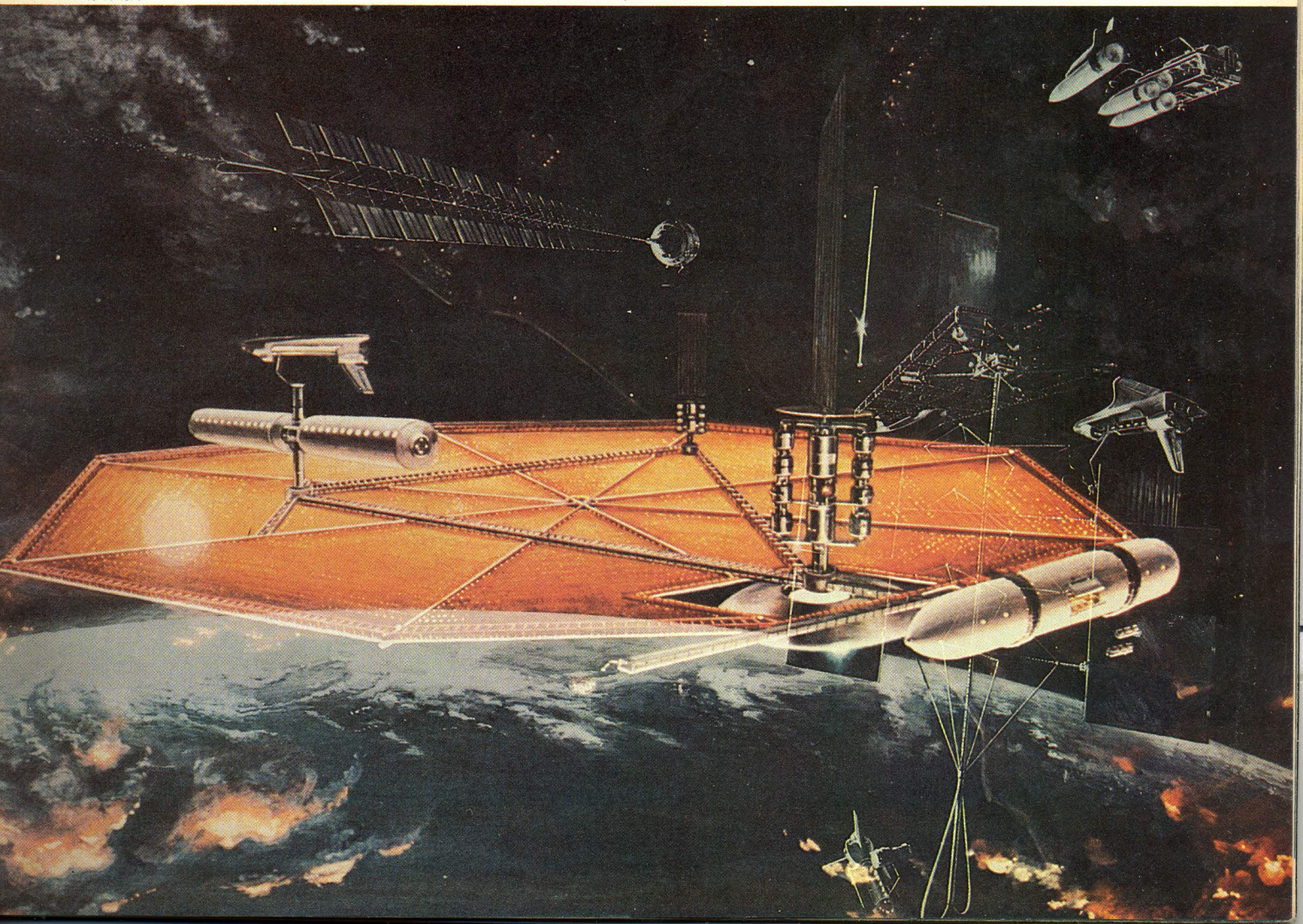


Photo © 1978 Warner Communications

UP, UP AND AWAY

An Exclusive Talk With Superman Portrayer Christopher Reeve

By RICHARD MEYERS

Look! Up there — on the 35 mm screen. Who is that mild-mannered guy? He's faster than a speeding bullet, more powerful than a monorail. He leaps tall buildings in a single bound. Is it an eagle? A Learjet? No, it's . . . it's . . . Chris Reeve!!

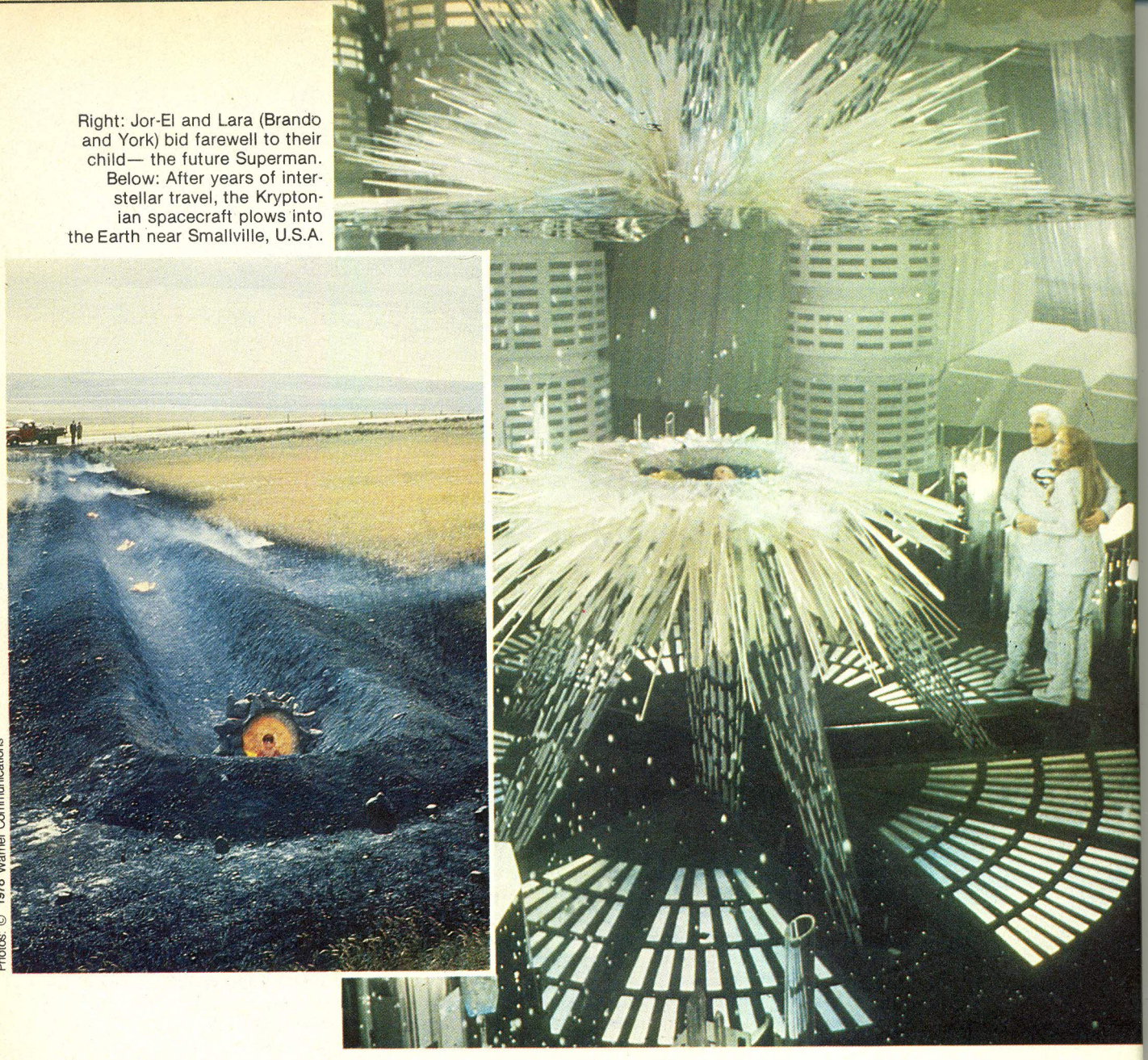
Film producers Ilya Salkind and Pierre Spengler are betting $50 million that the name Christopher Reeve, the star of the long-awaited revival of Superman, will become synonomous with the Man of Steel. Just as *Jaws* got people out of the water, they are banking on Reeve to get folks into *Superman — The Movie.*

Though not of direct kinship with his predecessor George, Chris shares a legend — as well as most of his last name — with the late television actor. For the better part of two years, the 25-year-old, 6'4" actor has been bringing to life the greatest comic book character ever created in *Superman —The Movie.* It has been his enviable task to become the first completely realized Man of Steel, without any technological or monetary limitations.

"There are a lot of people who have cared about Superman for a long time and that have loved him and read him and followed him for forty years," Reeve tells FUTURE, "and you can't have somebody who comes in saying, 'No, no, I think I'll do it my way.' It wouldn't be fair. I'm not going overboard on my own like some actor who's self-indulgent."

Self-indulgence has never been Reeve's strong suit, not even during his days on the Broadway stage with Katherine Hepburn in *A Matter of Gravity,* or his first film appearance with Charlton Heston in *Gray Lady Down.* And it certainly didn't enter into his initial *Superman* audition.

Superman (Christopher Reeve) stands amid his Fortress of Solitude, a massive crystalline construction designd by John Barry and built on Pinewood Studio's "007 Stage." It is here that the Man of Steel meets his destiny.



Right: Jor-El and Lara (Brando and York) bid farewell to their child— the future Superman. Below: After years of interstellar travel, the Kryptonian spacecraft plows into the Earth near Smallville, U.S.A.

Photos: © 1978 Warner Communications

"I was just on my way to go skiing," Reeve remembers, "just before Christmas, and my agent called to say, 'Dick Donner and Ilya Salkind are in town and they want to see you for *Superman.*' I said, 'What, me Superman? Ha!' I was always known as the Human Stringbean, and the stringbean did not connect to Superman. My second reaction was, 'Who needs it? They're going to screw it up anyway — no one will get it right.'

"But then I went in there and we didn't even talk about *Superman*. We talked about New York and the weather and stuff like that, and the only little flicker of interest came when Dick Donner said, 'Here, put these glasses on.' I just sat there in a burly fisherman's sweater trying to look stronger than I really was and wearing the glasses. But then I had to catch a train, so I went and forgot about it.

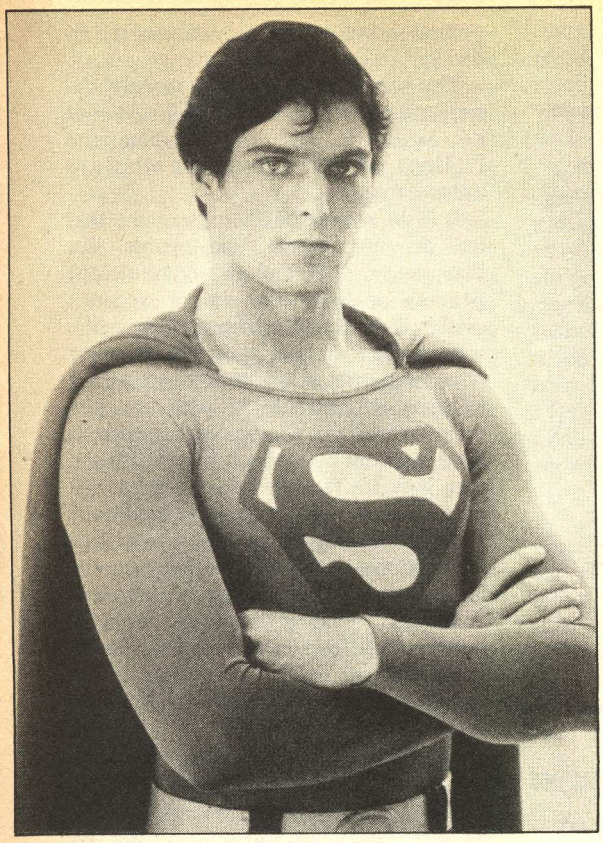
"A month later they called and said, 'Can you come to London tomorrow for a screen test?' And I said, 'No.' I was in a play and my understudy wasn't ready. 'But look, I'm free Sunday.' They said, 'Okay,' and so I went over there for a day and a half. Then I went back and forgot about it again. Two weeks later Rona Barrett broke it on *Good Morning America.* Someone called me up and said, 'Hey, congratulations.' I said, 'What are you talking about?'"

That was just the beginning of his bewilderment. The rest came from being the most important cog in a four-hour, multi-million dollar machine. "I was a little bit afraid of being treated as a prop," he recalls. "Fortunately that hasn't happened. It's a good outfit here. I mean, I'm not being plugged into a formula. The thing I really appreciate is that I'm being treated with respect for my acting background and not just 'stand here, put on this leotard and stand in the corner.' No one is treating me like I just came off the beach or something. Dick Donner is so talented, he's got very good taste and a really good eye. He can pick out what's right."

For a project of *Superman*'s magnitude, Donner *has* to have a good eye as much as Reeve *has* to be a good actor in order to pull the incredible characterizations through their developmental stages. The Man of Steel that audiences will see goes through some *very* heavy changes.

"Superman needs a lift now and then," Reeve explains. "I mean, there're times when he doesn't have it all figured out. At one point he has to admit he's failed, he makes mistakes. He says, 'I didn't know what to do.' I think that's a lot more interesting than a guy that aces it all the time. If you've got some guy that says, 'No problem, I'll cover that, I've got it made,' I think that's boring. A hero is someone who, in spite of weakness, doubt or not always knowing the answers goes ahead and overcomes anyway."

Besides defeating the nefarious plans of rival Lex Luthor (Gene Hackman), a ma-



"Superman has a temper all right . . . he gets angry, he gets impatient, he gets pushed too far. Luthor does that to him a couple of times and you'll see, Superman gets right on the edge—really blows it. He doesn't pussyfoot around . . . He's got a lot of power and he's not afraid to use it when the cause is right."

jor stumbling block in Superman's and Chris' history was the development of Clark Kent. After four decades of literary and media life, it is easy to forget that Clark Kent is basically a figment of the superhero's imagination.

"Before, I think Clark was always played as a limited portrayal," Reeve relates. "People think that you just put on a pair of glasses and you've got Clark Kent. I don't think that's enough. That's my little pride and joy, actually, trying to make the difference between Superman and Clark Kent more interesting than it's been in the past. It incorporates that underlying thought that Superman knows that the bumbling Kent is *his* portrayal. It's a calculated acting job he does. I mean, if he can walk through walls, he can damn well think up a good disguise."

Reeve is basing the "disguise" on equal degrees of Fred MacMurray, Cary Grant and Jimmy Stewart, recalling such great old movies as *Bringing Up Baby, Philadelphia Story* and *Mr. Smith Goes to Washington*. "A very eager, but bumbling, anxious-to-please kind of guy," Reeve adds. "He's just as sincere as the day is long, but things just don't quite work out.

"I carefully discussed this with the *Superman* writers and Sol Harrison of DC Comics. I asked how far I could go in making up Clark Kent? I told them I wanted to give him a few complexities. They said, 'Absolutely. We've got a comic book page that only has four frames to it, right? There's a limit to what we can do to create real life.' He and all the writers said, 'Please, do something with him — go on and flesh him out.' "

Naturally, what's said for Clark Kent goes quadruple for the Man of Steel. It is also safe to say that moviegoers will be coming to their local movie houses in December with very clear ideas on what Superman should look and act like. This fact is not lost on Christopher Reeve.

"This is a direct quote from the comic people," he declares. "I thought when I saw those guys they were just going to tell me about 'biff, bam and zocko,' nothing to help the actor. But they said to me, 'The most essential thing to remember is that Superman's an orphan. Think about the vulnerability that that implies. He comes from miles and miles away and the reason he stays on Earth is that he's already lost one home — he doesn't plan to lose another.'

"So that's why he's so giving. Superman has a great deal of love for his new home — he really cares. What makes him interesting as a person is open mindedness. Here's a man who believes in a time when it's not popular to believe. Most of us go through life saying it's not going to work. Here's a man who, without being pretentious or pompous, says, 'I believe in truth, justice and the American way.' He has simplicity. He's not a crusader who says, 'Believe it too or you're going to rot in hell.' He just goes about his business. I think that's fantastic."

Needless to say, the Man of Steel has the superpower to back up his beliefs when the going gets rough. "Superman has a temper, all right," Reeve agrees. "He gets angry, he gets impatient, he gets pushed too far. Luthor does that to him a couple of times and you'll see Superman gets right on the edge — really blows it. He doesn't pussyfoot around."

But after all the elaborations and adjustments, everyone on the *Superman* crew are after the same thing: to get to the heart of the phenomena; to take all the people who have been thrilled by the comic books, cartoons and TV series and multiply those thrills by twenty.

"Superman has really got to have it together all the time," Reeve admits. "It's not a movie where you can see him with bloodshot eyes, you know what I mean? It's not *On The Waterfront* where everybody looked plain because it was realism. In *Superman*, every hair's in place, the cape is pressed — the works. Everything has got to match, so I have to keep a constant discipline. It's just like going into training.

"Most actors don't go to see the daily rushes, but I've *had* to since we're doing two pictures at once. It's a long, long range of things to do. I've got to map how I'm going to develop. It's really hard. The first days of work I did in April were the climax — the most important scene in part two! It was the most difficult scene of all and I had to do it on the first day. I've done 'pay-offs' where I haven't done the 'lead-ins' yet. That's why I have to see rushes. I have to plan my performance."

Pieces of Reeve's plan include dealing with Superman's self-awareness as well as learning to be Clark Kent. This, in both Reeve's and Donner's estimation, makes up the heart of *Superman — The Movie.*

"How does a human being put it all together?" Reeve ponders. "How do you live, how do you talk on a phone, how do you meet a girl, how do you have breakfast? The process of discovery is very interesting to Superman. One of the first things he has a problem with as he grows up is how to 'be.' When he first meets his Krypton father, his first question is: 'Who am I?' And then he learns."

Amid the soul-searching and broadening of the character, however, are some very familiar Superman actions and mannerisms. Though times have changed, Metropolis is still the same; the *Daily Planet* is still there, Lois Lane still gets in an awful lot of trouble and, thank heaven, Superman is still Superman.

"Yeah," says Reeve with relish, "I strike those poses." Standing, he thrusts his fists to hips and for a moment, even though he stood in a white terry-cloth bathrobe in his English dressing room, Superman was alive and well and living in three dimensions. "Those are positions of defiance," Reeve explains. "He's got a lot of power and he's not afraid to use it when the cause is right.

"But you see, those times are reserved. If you go around changing in phone booths or ripping off your shirt all the time, it gets boring. But if you save it until those one or two times when it's really essential, then it's worth its weight in gold. Anybody can come out and make a lampoon out of it, anyone can come in and spoof it. That's easy. We're doing what's hard — giving it to you straight."

Publisher's Note: In these pages we have often pointed out that science fiction is not limited to ray guns and spaceships — it deals with people and life and the way things ought *to be in the future. Neither is the field removed from the day-to-day events of society and politics. Science fiction is not an isolated world. Every one of us who enjoys science fiction and looks forward to the future is touched in a very real way by the ideas and actions of politicians — for better or for worse.*

Sen. Briggs vs. SF Fandom

By DAVID GERROLD

Science fiction is a literature of ideas — especially dangerous ones.

This is the only way it can be, of course, because science itself is based on the notion that every idea, no matter how half-witted it may seem on first hearing, still deserves a fair test of its validity. Because science fiction is about the interface between human beings and ideas, there can be no idea that is too dangerous to be considered by the science-fiction writer — otherwise, he's copping out.

Those of us who consider science fiction to be something of a way of life, like to pride ourselves that science-fiction people are somehow better than "mundanes" — that we are more forward looking, more intelligent, and in particular, more enlightened.

Sometimes, however, it isn't as easy as it seems. Sometimes it's pretty damn scary to confront a new idea head on, or even to look at an old one without old prejudices.

Let me start with a specific case. The World Science Fiction Convention is the most important event on the science-fiction calendar. Last year, at the 35th annual Worldcon, held in Miami, Florida, one of the most important social events of the convention was the "Happy Gays Are Here Again" party, sponsored by a group of science-fiction fans who happen to be gay or in favor of gay rights. There are quite a few; fandom is a subculture of underdogs who have learned to cooperate for mutual benefit. (As I understand the thrust of the gay rights movement, it is based on Thomas Jefferson's radical idea that anyone who pays his or her fair share of taxes is entitled to his or her fair share of government services, *including* the government-guaranteed right to equal opportunities for housing and employment.)

The sponsors of the party sold "Happy Gays Are Here Again" buttons to friends and supporters all over the convention to help defray the cost of the party. To wear one of the bright pink buttons did not necessarily mean that you were gay, but that you were unafraid to support your friends who were. Wearers of the buttons included many of the top writers, artists and fans in the science-fiction field. It was a way for the science-fiction family to say to some of its members: "We don't care what happened here in Dade County last June — we love you anyway." It was a small moment of unity where the SF community supported some of its own who were under attack for being different. Science-fiction people are used to being penalized for being "different." We don't like it. It wasn't too long ago that merely liking science fiction identified you as a certifiable crazy.

But, later on, when I tried to tell someone about that party, someone who hadn't been there, he couldn't understand — he *wouldn't* understand. He kept telling me that homosexuality is a sign of decadence; he kept telling me all the old familiar generalizations — including the one about how ancient Rome was never conquered until it rotted away from within. (Sigh.)

That's when I realized something, and I asked this man, "Do you know anyone who is gay?"

He said no.

And I knew he was wrong. He knew quite a few people who were gay — he just didn't know that they were gay. He would *never* know that some of his best friends were gay, because as long as he kept making these heartless and stupid generalizations, no gay person would ever want to trust him with the knowledge. The man would use it as a bludgeon.

The odds are that most of the people who you know who might be gay have not told you so — in fact, there is no way for you to know *unless* they trust you well enough to confide that information to you.

This is the point at which we must approach the subject with a bit of rationality. Let us make an attempt to deal with the concept of objectivity instead of prejudice — because the crux of the matter is that we don't really know what homosexuality represents at all.

We know what it *is* — it is a same-sex physical or emotional attraction — but we do not know the *why* behind it. We do know that it is very definitely a part of the human condition. It has existed in all human cultures in a variety of ways since the beginning of recorded history. In some cultures it is honored, in some cultures it is a formal ritual, in some cultures it is tolerated, and in others it is actively oppressed — but it exists regardless of the individual culture's attitudes.

The word, homosexual, merely *describes* a preference or way of life, it does not *explain* it, nor does it explain the feelings of the individuals who are homosexual.

It is the *reasons* for homosexuality that we do not know, and words like blasphemy, perversion, compulsion, sickness, or dysfunction do not explain it — they only cloud the issue, muddying the water more than clearing it. We will never have an understanding until we are willing to approach the subject with an open mind. We will not determine what causes it if we start out by saying it is a disease and then look for facts to prove it. What if it isn't a disease, but a hereditary condition? — or a psychological condition? — or even an emotional condition? We don't know if it is a momentary, recurring or permanent condition. What if there are a whole bunch of different causes for homosexuality, all of which express themselves through the same single activity? Wouldn't that confuse the issue?

The crux of the matter is that we don't know what homosexuality truly is because no one has ever been able to do the kind of study that would give us the answers. We know only what forms the expression of homosexuality takes, we do not know the *why* of it, and we will never know the why until we close our mouths, open our eyes and ask the question itself: "Why?"

This is what the scientific method is all about. First you look at the facts — only the facts, opinions don't count — then you hypothesize, then you test your hypothesis. If your theory satisfies all the facts and proves out with every test, then maybe you have found an answer — maybe even *the* answer — unless there's a fact your hypothesis doesn't cover; then you have to start all over. That's how science works — and that's what good science fiction is about. Every idea must be considered logically — even highly charged emotional ideas — no matter how strongly you feel toward or against that subject. Anything less than that is prejudice.

And that brings me to John Briggs.

Here in California, State Senator John Briggs — who ran unsuccessfully for the Republican nomination for governor — has qualified an initiative for the November ballot which will prohibit the employment of homosexuals as teachers. The rationale is the protection of the children—but current statistics demonstrate that the overwhelming majority of child molestations (more than 90 percent) are perpetrated by predominantly heterosexual individuals. A child may actually be safer with a gay teacher than with a straight one. The proposed bill will also prohibit any classroom courses *about* homosexuality for fear such studies might encourage students to become gay. It is that latter clause that is of some interest to science-fiction fans in particular.

One of the most popular and outspoken young science-fiction authors, David Gerrold has won critical acclaim for his novels The Man Who Folded Himself, When Harlie Was One *and* Deathbeast. *He also penned one of the most memorable* Star Trek *episodes, "The Trouble With Tribbles," and currently writes a regular column for STARLOG magazine in which he discusses ideas and trends in the science-fiction field.*

Should that bill be passed into law, the following individuals could legitimately be prohibited from speaking on campuses in the state of California or from having their books in school libraries: Robert A. Heinlein, Arthur C. Clarke, Theodore Sturgeon, Isaac Asimov, Frank Herbert, Joe Haldeman, Anne McCaffrey, John Varley, Samuel R. Delany, Tom Scortia, Frank Robinson, Robert Silverberg, John Brunner, Marion Zimmer Bradley, Fletcher Pratt, Thomas Burnett Swann, Ursula K. LeGuin, Harlan Ellison, Joanna Russ, Fred Pohl, Edgar Pangborn, Olaf Stapleton, Elizabeth Lynn, Suzy McKee Charnas, and others.

What?!! you say. Are all of these people gay?

I don't know if *any* of them are, and it wouldn't matter if I did. I still wouldn't say anything about their private lives, no matter what, because it's none of anybody else's business. But each of these writers has at one time or another written at least one story or novel or article that has treated a gay character or theme with compassion. By the strictest possible interpretation of the Briggs bill (which may be exactly what he has in mind), these writers and their works could be banned from California campuses because they could be accused of advocating homosexuality.

Take a good look at the books listed on this page (see sidebar). Most of the writers on it are the top writers working in the field today. Many of their works are Hugo and Nebula award winners and nominees.

There are probably as many more examples of writers and SF books with gay themes or characters that are not of the quality listed here, but this was compiled to show you just how far a prejudice *could* be carried.

Who suffers if these books are denied their readership?

The authors? Certainly. The authors lose money and readers.

The readers? Certainly. Probably the readers would be hurt even more than the authors by being denied access to some of the best science-fiction stories written in recent years.

Gay people? Probably not directly — but indirectly gay individuals will be hurt because the negative stereotypes will be continued when some of the voices speaking for compassion are stifled. I have lost a cousin and a close friend to suicide because they had no one to tell them that they were not alone in their pain.

Twenty years ago, there were very few books in print that treated homosexuality with compassion — not necessarily sympathetic views, but at least a measure of understanding. This did not mean that all the writers and readers were heterosexual — it just meant that gay people would not see reflections of themselves in the literature; like blacks, they were being subliminally told that they did not exist, and by implication, that they had no right to exist.

That is changing. If a person is gay, they are going to be gay, and not Anita Bryant nor John Briggs nor all the vile epithets that anyone can think of can change a person's orientation. All that demagoguery accomplishes is the encouragement of fear and self-hatred in people who happen to be gay, people who are certain that their friends and relatives will be unable to accept their difference.

Most of this magazine's readers are between the ages of 13 and 25, a time when decisions are made which will affect the course of a whole life. These decisions should be carefully made. What would you do if your best friend came to you and said, "I'm gay." Would you say, "We can't be friends anymore because other people will think I'm gay, too." Or would you say, "I'm glad that you trust me with that knowledge of yourself. I'll stand by you because you're probably going to need my friendship and support." The latter answer is harder, of course, but it is one measure of how true a friendship is.

Besides, consider this — what if *you* turn out to be gay yourself? It's possible. What would you want your friends to say to you?

There are people reading this magazine who may be in the process of discovering that they are gay, who may feel terribly alone, who may feel that they are the only person in the world who is gay, because no one else around them will admit to it, because no one around them will discuss the subject with compassion or understanding. These are the people who are being hurt the most: young men and women who are learning that they are no longer children, but are growing into adult human beings with adult emotions and sexual feelings. They need to learn how to deal with those feelings, and they need to do so in an atmosphere that is mature and non-judgmental. Research suggests that a person's sexual identity begins forming quite early in life. It is in adolescence that a person has to learn how to cope with it. Science fiction will help you cope with almost everything else in your universe — shouldn't sexual identity also be a fair subject for consideration?

And if, by the by, we help some person come to a more rational way to survive, *whether gay or straight,* then isn't that a positive goal?

Those aliens that came out of the mother ship at the end of *Close Encounters* looked fairly sexless to me — what if our scientists discovered that they only had *one* sex? Or *three?* Wouldn't we want to give these aliens a fair study before we drew any conclusions about their lifestyle? Shouldn't we at least offer the same consideration to our fellow human beings?

The unique idea of the American system is that each of us has the right to live our own life as we choose, so long as we bring no harm to others — but that right also demands the responsibility from each of us to understand that every one of us is different and unique. The joy and vitality of life lies in the discovery of other people's special qualities. How better to understand the universe and our place in it than by learning to share the wealth of human experiences — the different as well as the similar, the discomforting as well as the safe.

That some people happen to be gay is such a little thing, so unimportant, when considered against the vaster perspective of time and history — and the lesson of history is that it is not homosexuality that is the threat to a society, so much as the fear of it and the kind of frantic overreactions that spark witchhunts. The truth is that the fear of *anything* will hurt more people than the actual thing itself — *whatever* it may be.

The following books and stories *could* be trimmed out of the school libraries because they might *seem* to advocate homosexuality as a valid alternative:

The Word for World is Forest, The Left Hand of Darkness, The Dispossessed, by Ursula K. LeGuin.
Thorns, Passengers, Son of Man, Hawksbill Station, by Robert Silverberg.
Dragonquest, Dragonflight, The White Dragon, by Anne McCaffrey.
Dune, by Frank Herbert.
Imperial Earth, by Arthur C. Clarke.
The World Well Lost, Affair With a Green Monkey, Venus Plus X, by Theodore Sturgeon.
Moonstar Odyssey, The Man Who Folded Himself, by David Gerrold.
The Well of the Unicorn, by Fletcher Pratt.
The Sheep Look Up, by John Brunner.
I Will Fear No Evil, Time Enough for Love, by Robert A. Heinlein.
The Forever War, by Joe Haldeman.
Dhalgren, Triton, by Samuel R. Delaney.
The Female Man, And Chaos Died, by Joanna Russ.
Gateway, by Fred Pohl.
The Ophiuchi Hotline, by John Varley.
Don't Bite the Sun, Drinking Sapphire Wine, by Tamith Lee.
How Are the Mighty Fallen, by Thomas Burnett Swann.
Interview With the Vampire, by Ann Rice.
Walk to the End of the World, by Suzy McKee Charnas.
The entire *Darkover* series of novels by Marion Zimmer Bradley.

Brave New World

Edited by ED NAHA

Imagine a world populated by a race of humans bred on assembly lines. A pseudo Utopia where a person's IQ is dictated by the government, where mood-altering drugs are forcibly administered by bureaucrats, where Henry Ford is considered a god and where individualism is dead. Author Aldous Huxley envisioned just such a surrealistic landscape in 1932 in his classic novel *Brave New World.* This fall, NBC will attempt to recreate Huxley's satirical nightmare via a two-part mini-series written for TV by Robert E. Thompson, produced by Jacqueline Babbin and directed by Burt Brinckerhoff.

As in Huxley's original concept, the storyline will be primarily concerned with people . . . people caught in a mind-numbing lifestyle of the year 600 AF (After Ford). Basically, the plot concerns the individualistic actions of John Savage (Kristofer Tabori), an outcast human being "mistakenly" born in a human womb due to a slight miscalculation on the part of head baby manufacturer Thomas Grahmbell (Keir Dullea) and his jilted sweetheart Linda (Julie Cobb). Also rebelling in his own cockeyed way is Bernard Marx (Bud Cort), a social misfit created by a chemical imbalance occuring during his assembly-line birth. Further complicating matters is a love interest between Savage and model citizen Lenina Disney (Marcia Strassman) and the meddling of Mustapha Mond (Ron O'Neal), the leader of the mundane society.

As confusing as that thumbnail description may seem, the book itself is an amazingly riveting, cohesive work; a work which, according to producer Babbin, has been successfully adapted to the tube. "I think we've been faithful to the book," the sandy-haired producer beams. "We hardly updated it at all. Huxley had his assembly-line babies born in bottles — we use baggies. We also chose to start off the show with a typical Brave New World religion class, with children chanting 'Ford be praised' and so forth. We did that so viewers would realize that we were referring to industrialist Henry Ford and not ex-president Gerry Ford. We wanted to emphasize that Huxley was inspired, in part, by the deification of the assembly-line process earlier in this century.

"The only other change was the actual location of the BNW. In his book, Huxley refers to the city as being a futuristic London. We place the story in no city in particular. It's the ultimate conglomerate city. It stretches forever, on and on."

Babbin, the producer of the highly acclaimed telefilm *Sybil,* first came across the *Brave New World* project two years ago. Following her success with *Sybil,* she was given a second script to produce by Universal. "I gave it right back to them," she laughs. "It eventually wound up being *Rosetti and Ryan.* I was so bored with all those buddy-boy stories. You know, one's neat — the other's sloppy. Yccch."

The president of Universal TV started tossing possible book projects at Babbin, finally coming up with the Huxley novel. "I said 'WOW! This is one of my favorite books in the world.' I decided to re-read it, though, to be sure about its potential on TV. There had been so many rip-offs made of its plot, with films like *Logan's Run* and *THX-1138* using elements. I wanted to make sure the original book would stand up on its own. It did. No one has ever been able to accomplish what *BNW* did. No one has ever attempted to film it, either. Probably because to do it as straight science fiction would be too expensive. And to adhere strictly to the book's storyline would be chaos. There's a flashback in the middle of the book where John recalls his childhood. It disrupts the chronological order of the story. When I decided to tackle the movie, I had two thoughts. One: to me, *Brave New World* is about *people,* not hardware. Two: I decided to unscramble the order of events and start the whole thing off with Thomas and Linda going off to Savage-land and then trace the concurrent births of Bernard and John and watch their growth processes; dropping in at ages six, twelve and finally, manhood."

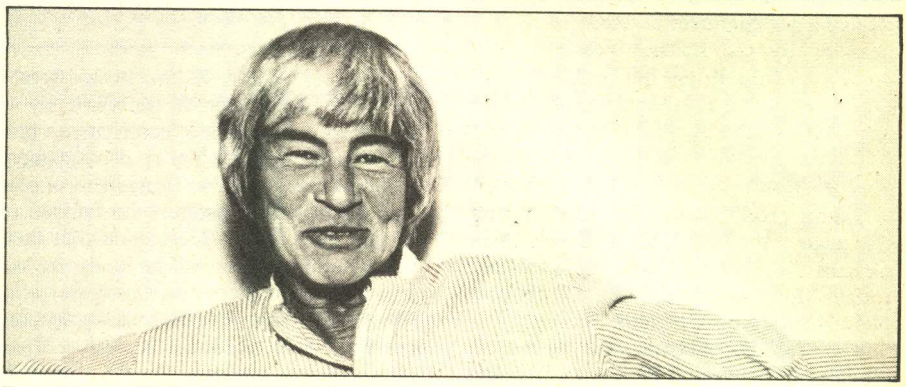
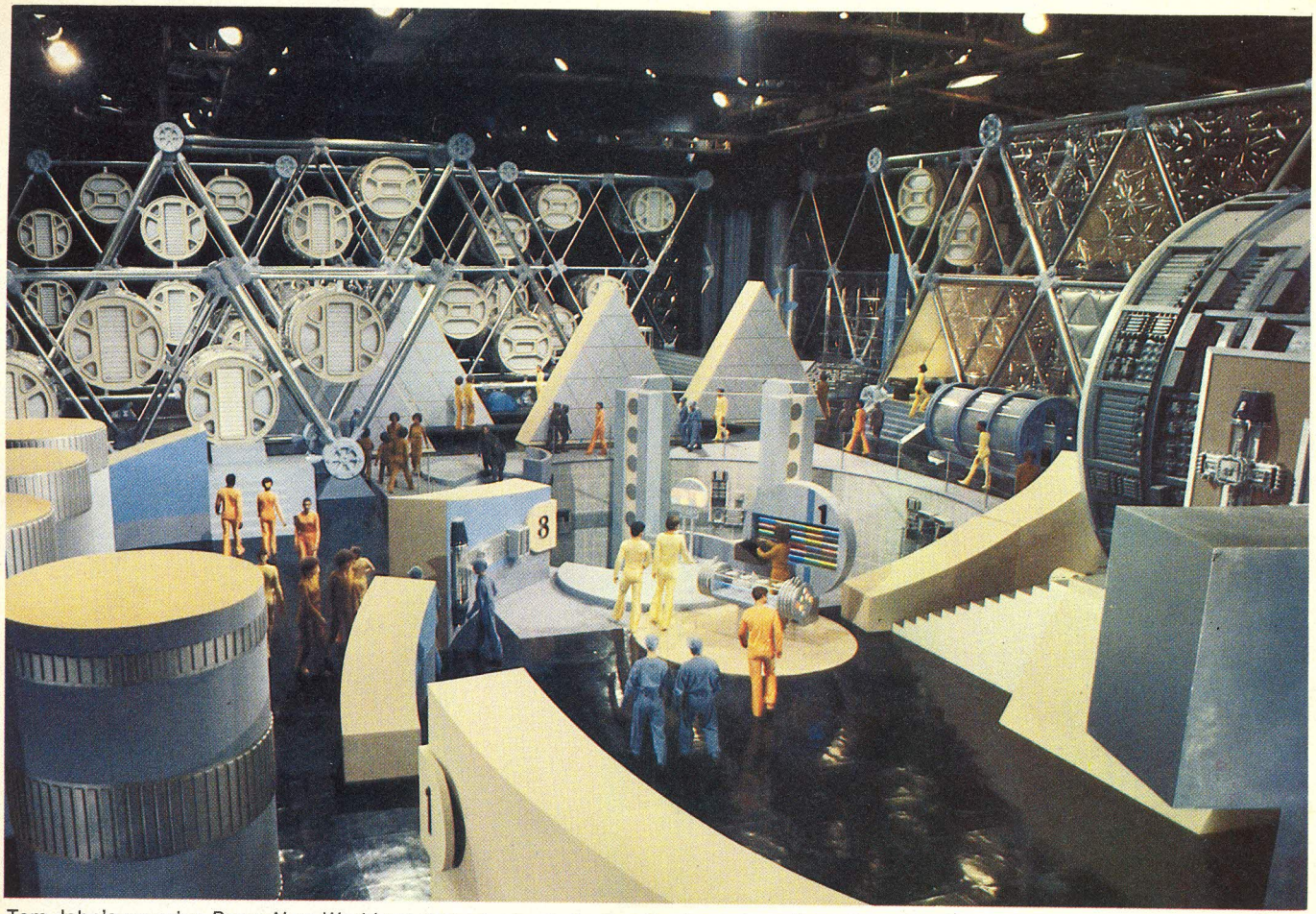


Photo: David Hutchison

Top of page: Grahmbell (Keir Dullea), Helmholtz (Dick Anthony Williams) and the Gamma Twins (Beatrice and Patrick Cronin). Above: producer Jacqueline Babbin.



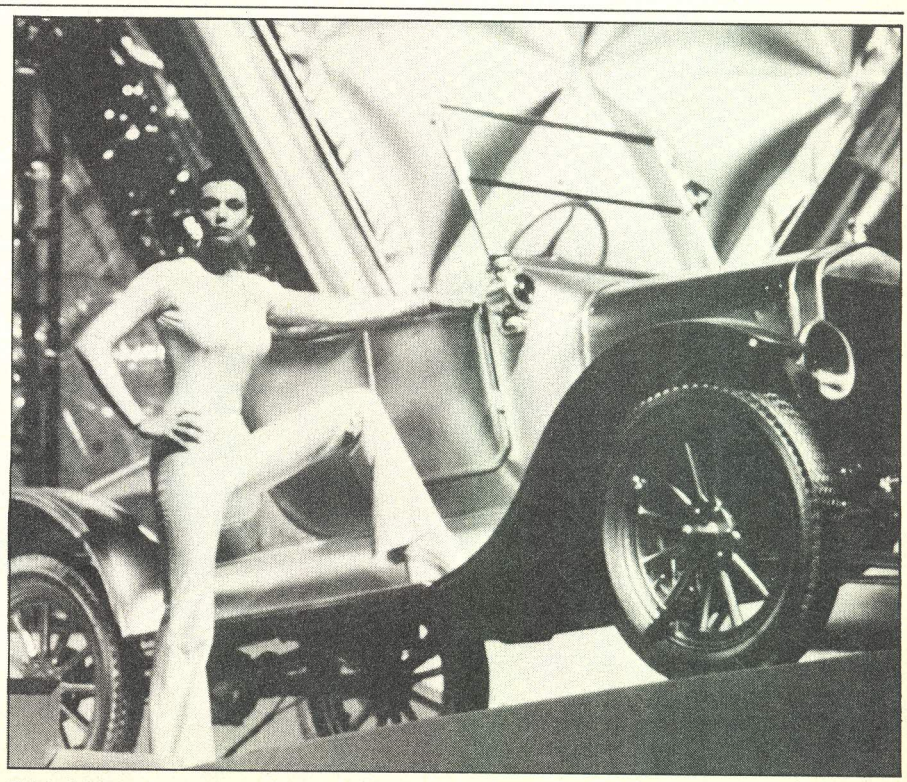
Tom John's massive *Brave New World* set was constructed only after he and producer Babbin had reviewed key futuristic films of the past in an effort to avoid structural duplication. The look is sleek, metallic and incredibly clean.

On December 6, 1976, Babbin began working on the project. "By June of 1977," she recounts, "Robert E. Thompson had done a marvelous first two hours of the script. We went to NBC who went into shock at some of the language. You know, people saying, 'have you *had* so and so?' or 'have you *been with* so and so?' Robert calmed them down with a beautiful euphemism. Now people ask 'have you *engaged* with so and so.' Harmless, right?"

By August, the full four hours had been scripted and a two-part, two-hour miniseries agreed upon. But Babbin and her staff then had to *design* the show in order to convince the network and the studio that the play could be done on a reasonable budget. "I had a marvelous production designer," Babbin says, "Tom John. We both wanted the city to look like nothing that's ever been seen before. We viewed just about every futuristic film we could get our paws on to make sure that what Tom came up with was something never before attempted. We managed to do it."

Finally, in February of this year, Babbin

(continued on page 58)



Trish O'Neill as Maoina Krups, Asst. Controller of the Western World, lounges at the entrance of Rotunda Cathedral where the revered Model-T Ford stands.

Photo: Community Architects

FUTURE ARCHITECTURE

PASSIVE SOLAR SYSTEMS

The Changing Shape Of Our Energy Future

Photo: Regina Baraban

By REGINA BARABAN

There's a revolution in building design spreading across the land; a futuristic movement based on ideas thousands of years old. While large architectural firms ponder the possibility of creating new variations on the flat-top, energy-eating skyscraper, a grassroots army composed of both architects and enterprising home owner-builders is finding that substantial amounts of energy can be saved through the use of passive solar techniques. Their goal is the eventual creation of a comfortable living environment that stays cool in the summer and warm in the winter *solely* through natural processes and a built-in approach to solar heating.

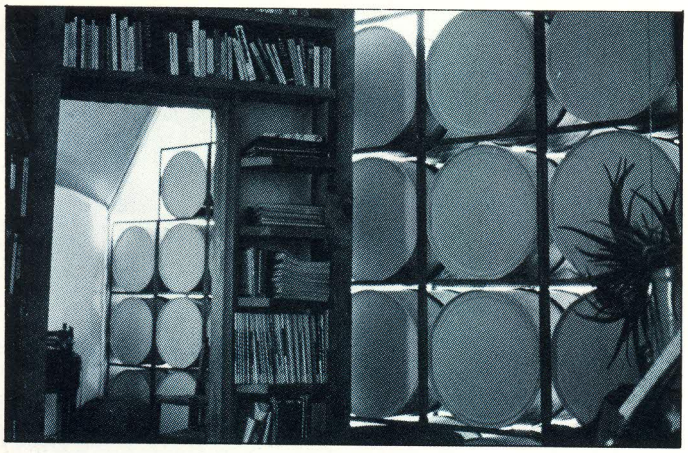
Regina Baraban, of Regina Baraban Consulting, writes on design and the future.

The new, simplistic passive solar movement is a far cry from the highly technologized energy future predicted by visionaries back in the 1950s. Those vintage dreams of personal atomic reactors providing unlimited household energy still hover in the realm of fantasy, while an assortment of basic concepts developed over two millennia ago by primitive peoples are now proving to be the hope of tomorrow.

In a passive solar energy system, the building itself collects and stores the Sun's radiant energy in the form of heat. Technology is important but logic equally fits in the passive scenario. The building is

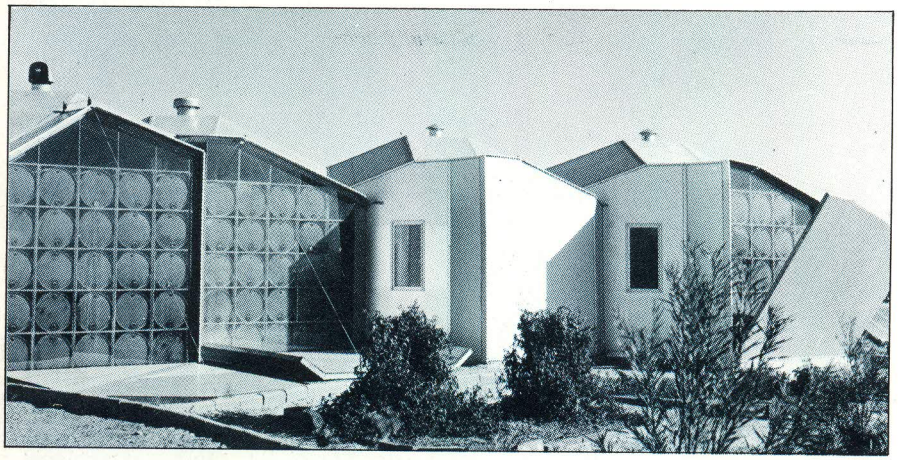
Left: Foam dome house in Denver uses insulation and sunlight to save two-thirds of energy required by conventional houses.

Above: Almost 1,000 years ago the Mesa Verde Indians used cliff overhangs to keep cool in summer, warm in winter.



Photos: Zomeworks

Steve Baer's Zome House uses 50-gallon water-filled drums in south windows to keep temperature comfy year-round.



treated almost as a living organism that uses indigenous natural forces as well as common - sense techniques to control energy consumption. When passive solar energy boosters refer to a home's indigenous qualities, they talk about such natural properties as its location, surrounding terrain, climate and building materials. For example, in 1100 A.D. southwest American Indians built their cliff dwellings from native stone, using the cliff as a natural overhang to block the intense summer Sun, thus creating a cool environment within. Today this same principle is hard at work with the use of awnings or overhangs on homes and commercial buildings.

Passive solar energy techniques have been utilized throughout history with spectacular results. The adobe dwellings of the Pueblo Indians are splendid exercises in energy conservation. Made of sun-dried, compressed clay and straw bricks, the thick adobe walls have what is called high *thermal mass* — which means that they provide excellent insulation. They absorb solar heat during the day and then radiate the heat into the living quarters during the cold desert night.

In the new passive solar movement, special structural materials called *phase change* materials will be used to construct walls and ceilings in the near future, in

(Continued on page 47)

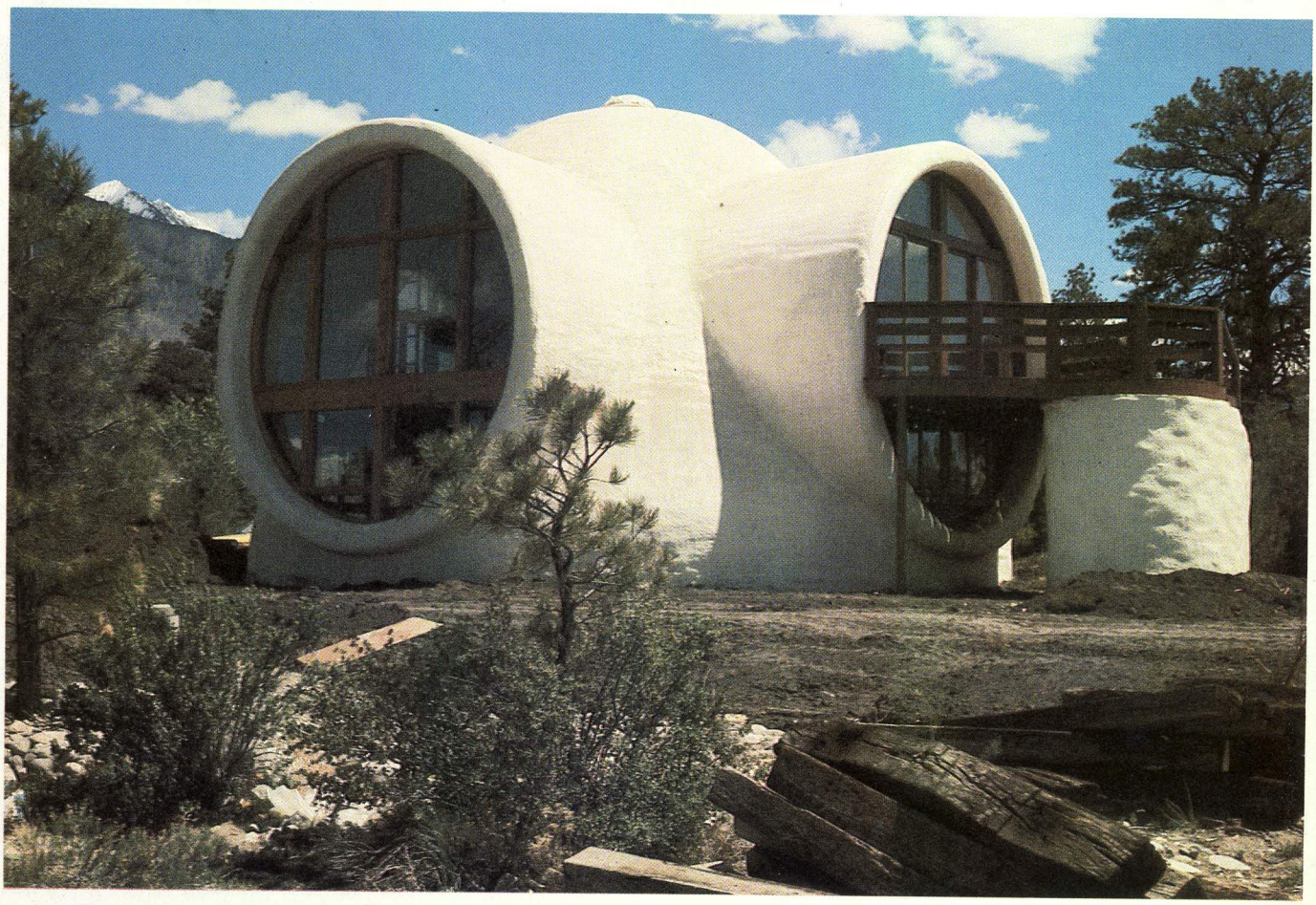
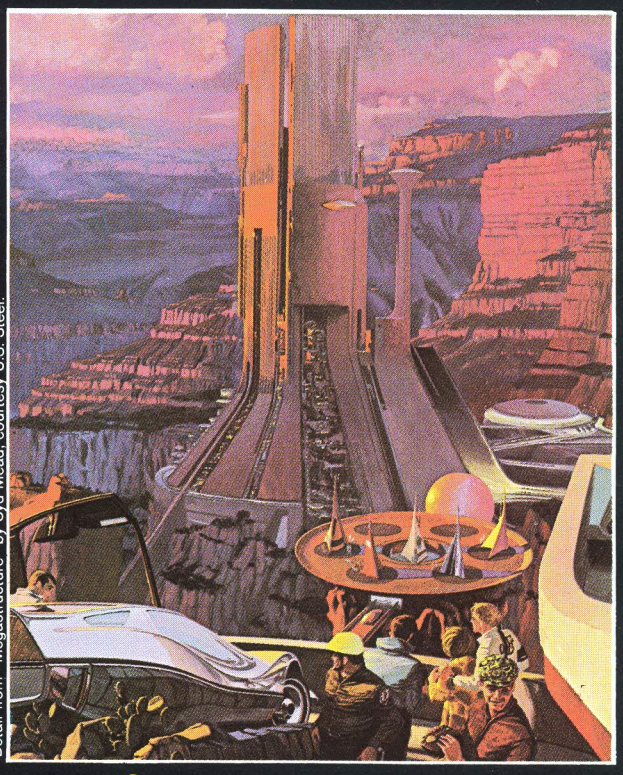


Photo: Community Architects

Dome office building in Denver is insulated by sprayed polyurethane covered by thin concrete shell, for efficient energy system.



Detail from "Megastructure" by Syd Mead, courtesy U.S. Steel.

Syd Mead

Moving Toward Tomorrow

Syd Mead is an artist and industrial designer with a special flair for imagining sleek, futuristic machinery. His paintings of future transportation vehicles — many done in the sixties when he worked for U.S. Steel — have had a hand in setting our expectations for stylish travel of tomorrow. On Syd Mead's canvas, technology becomes synonymous with beauty.

Syd Mead thinks of himself as a futurist. "I believe very strongly in the romance of technical possibilities," he says. "It's too late in time for everybody to grow his own beans. I realize there's an anti-technology wave of opinion today, but I wouldn't want to entrust my future to people who think like that. I think it's important to romanticize and glamourize the possibilities of serious technological advance."

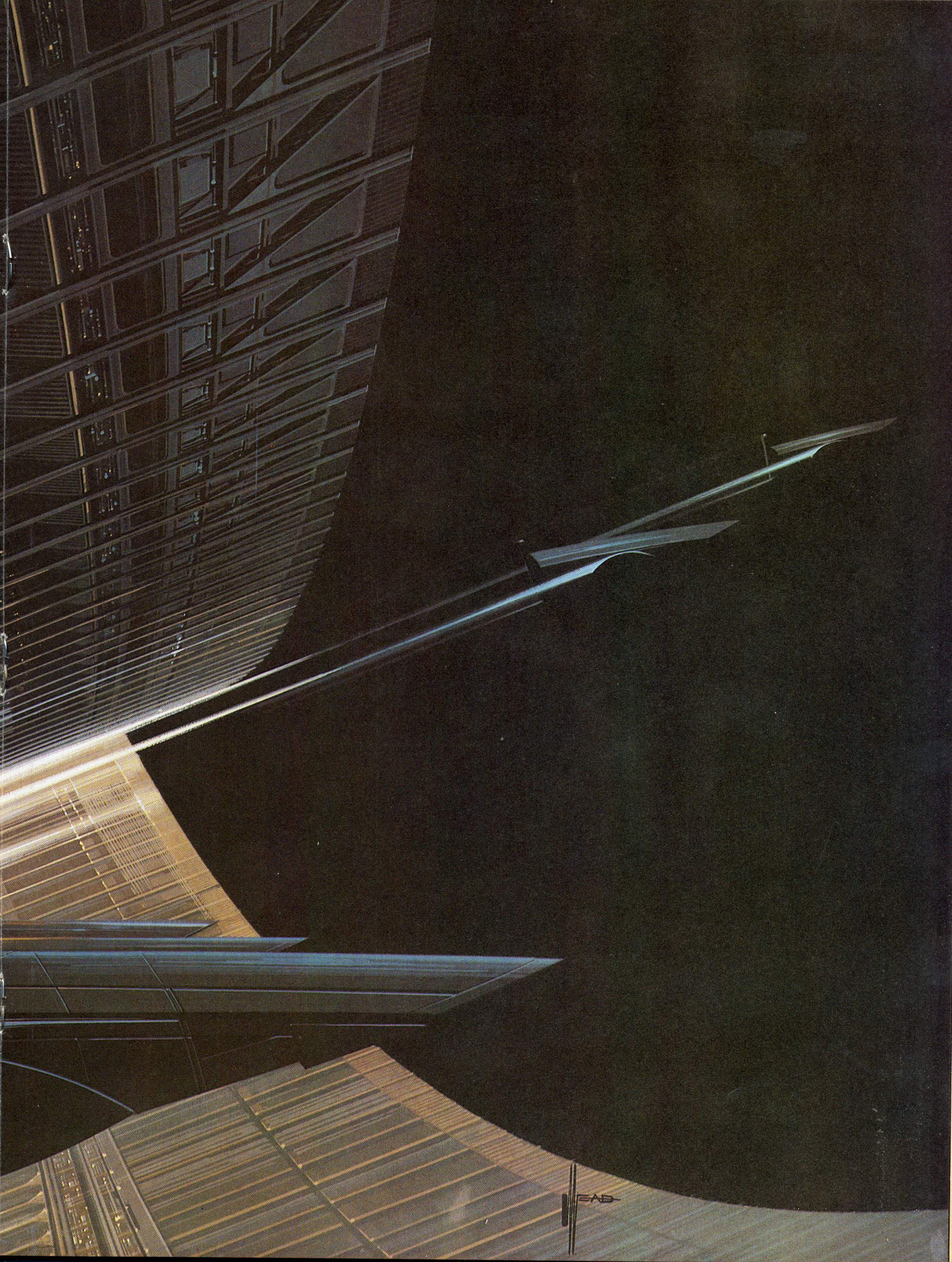
He keeps up with scientific and technical progress because, he says, "You need that in order to be able to imagine the future."

Currently he's involved in imagining the future for a Hollywood film studio, doing conceptual designs for a movie that's still in the planning stages. "They want me to come up with the ideas and translate them into solid visualizations, so the model-makers and special effects people can move in and duplicate them." Beyond that, he won't divulge any details.

Although Mead is perhaps best known for his renderings of Earthbound transportation systems, he's been painting spaceships since his early teens. When he paints to entertain himself, the setting is likely to be off the planet. The painting on the following two pages is an example: sleek, four-man spacecraft are being launched from a rotating space station. Only a small part of the three-mile diameter space station is visible. The craft is disc-shaped, with the launching slot around its entire perimeter. Normally, the launching slot is closed and the spacecraft stored at a 90-degree angle to the launch position. But when it's time for action the launch slot irises open, the spacecraft lower into position and the crewmembers run along the ramps to board the ships. At a signal from the command post, each spacecraft lifts off by a hot-gas system. Once clear of the space station, ion drive takes over — causing the brilliant blue exhaust trail.

EDITOR'S NOTE: In response to a large volume of reader mail requesting even more presentation of astronomical and other imaginative art, we are inaugurating a new periodic feature: FUTURE GALLERY. Each center-spread appearance will spotlight an outstanding painting by an established professional in the field or by an unusually talented discovery. The criterion for inclusion in FUTURE GALLERY is artistic ability.

Center spread: "Launch Slot Alert" ©1977 by Syd Mead



ABC's Multi-Million

BATTLESTAR

Is **Battlestar Galactica** the most expensive series ever produced for TV? Is it really a **Star Wars** rip-off? Will it live up to the hopes and visions of the show's producers, John Dykstra and Glen Larson? What will it mean to the future of SF on TV? These questions are at the crux of ABC's million-dollar gamble.

By DAVID HOUSTON

Whatever historians hold in store for it, *Battlestar Galactica* is sure to be remembered by many as the most extraordinary show every produced by American television — a phenomenon with more than its share of "firsts." Consider the legal fires out of which it arose, a singed but soaring Phoenix:

In early summer, 20th Century-Fox sued Universal Studios (MCA) for copyright infringement, claiming that *Galactica* was a flat out copy of *Star Wars* — and was being advertised as such by Universal. An executive at Universal argued that this was like the first Western

Dollar SF Gamble
GALACTICA

movie ever made suing the second. "We're not losing any sleep over it," he said unofficially.

But someone at Universal was losing sleep, for within weeks Universal had announced their suit against Fox, claiming that their half-pint robot idea (R2D2) was a direct steal from Universal's *Silent Running*.

Around this time, George Lucas, creator of *Star Wars*, visited Universal, saw the first three hours of *Galactica*, and said he would not join Fox in their suit against it. *Galactica* creator Glen A. Larson reported that to *Variety* — and Lucas felt obliged to inform *Variety* directly that he *did* think *Galactica* infringed on the prerogatives of *Star Wars*, but that since the property was owned by Fox, not Lucas, he couldn't be a party to the suit if he wanted to.

More paper bullets flew. Fox then sued Universal to prevent them from marketing *Galactica* toys and merchandise (since, Fox claimed, they were derived from stolen property); Universal countersued, asking Fox for damages because of a "violation of the California business and professional code."

Meanwhile, a theatrical version of *Galactica* — pared down a bit here, beefed up a bit there — based on the three-hour TV pilot, opened in Canada. And nothing happened. Except that money rolled in for Universal and everybody along the *Galactica* bread line.

At the same time, production on subsequent hours for television continued to roll at Universal Studios. With the multi-multi-million-dollar suits hanging over them, the production company worked blithely away. (If Fox had won all its points in court, Universal would have been seriously crippled.)

Apparently no one knows exactly how much *Galactica* is costing. An average hour-long show of any other series seldom tops $300,000. The *Galactica* office announced a budget of around $7 million for their initial deal — a three-hour pilot and two two-hour episodes. That averages out to $1 million per hour. On an average, that tops previous TV budgets. However, after completion of the first three-hour story,

reputable sources were saying the budget had already topped $9 million ($3 million per hour); and Canadian publicity for the theatrical release claimed that *Galactica* was two years in the making at a cost of over $14 million.

An ABC-TV source said, "But you have to spread that out all over the place — start-up sets, costumes and special effects for the whole series, special advertising and promotion for the theatrical release unrelated to TV costs. And if it's been two years in the making . . . well, maybe two years from the day it first crossed Glen Larson's mind." Larson is creator, writer and executive producer for Universal.

Actor Dirk Benedict (who plays Starbuck in *Galactica*) said it was his impression that, "They're spending so much money they're embarrassed to admit how much!" A single visit to one of the main *Galactica* sets easily indicates how Benedict got his idea. The electronics alone for the "bridge" of the starship cost a reported $1.5 million.

Actor Richard Hatch (who plays Captain Apollo — he's sort of a "Luke Skywalker" to Benedict's "Han Solo") also mentioned the money angle. "Most companies have to continuously cut corners, settle for less than the best. Not *Galactica*." Hatch has been pleased and surprised more than once by the time-and-money-consuming care taken to reshoot a scene until it looks just right. "They know it's the little places that count."

Back at the network, ABC executives just settled back and enjoyed all the publicity generated by the lawsuits. The people who *bought* Universal's new space fantasy were indemnified against loss and

Photo: © 1978 ABC

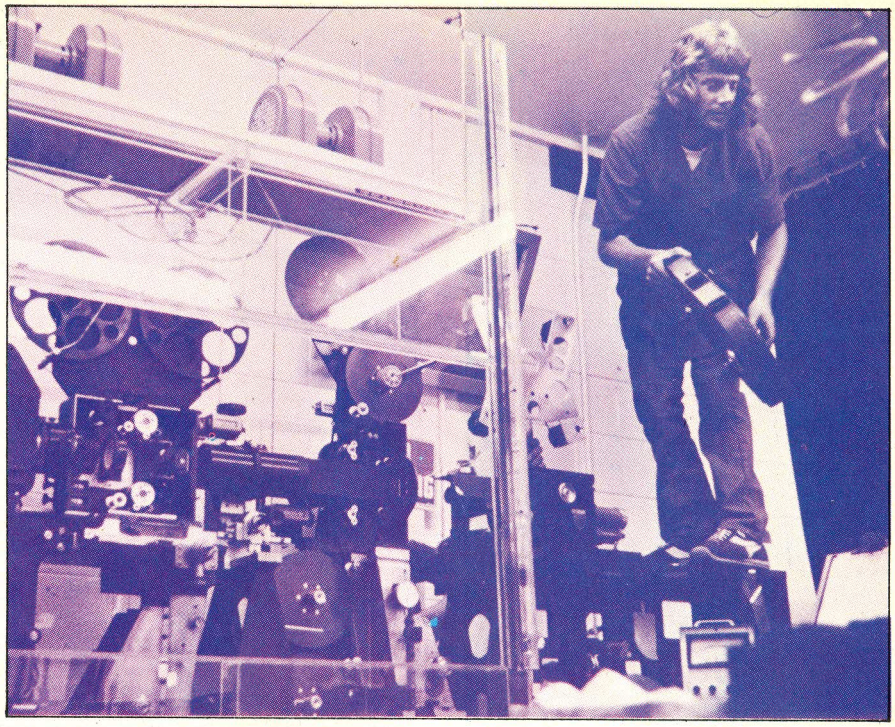


Photo: © 1978 Universal

Left: The gleaming Cylon warriors attempt to rid the galaxy of the "human pest."
Above: Richard Alexander reloads Industrial Light & Magic's custom optical printer.

were not party to the legal warfare. Furthermore, when ABC saw the first half hour or so of the edited *Galactica*, the network quickly withdrew its offer to buy a three-hour and two two-hour pilots and told Universal to go right into weekly series production without ever having shown a pilot. Thus, before the lawsuits had been settled, before the movie opened in Canada, and before the American public had seen a single minute of the epic, *Galactica* had moved into the planning of its eighth-through-thirteenth hours of programming, and the two-hour dramas had been converted into two-part episodes, to be shown in consecutive weeks.

Until the time of the expansion of the ABC-Universal deal, all special effects had been under the supervision of John Dykstra, who also served as producer for the three-hour pilot. Universal leased Dykstra's company, Industrial Light and Magic, and temporarily called it "Universal 57." Dykstra had created the history-making effects of *Star Wars* and, regrettably, this probably accounts for some of the claim that *Galactica* looks like *Star Wars*. The spaceships, aliens and other miniatures and special effects were all different, but Dykstra's design and photographic style were omnipresent.

Dennis Muren (who photographed effects for both *Star Wars* and *Close Encounters of the Third Kind*) thinks the *Galactica* effects are in many ways better than those of *Star Wars*. Muren said it took Industrial Light and Magic almost the whole of *Star Wars*' shooting time to master their new equipment and techniques. "Two dozen shots in *Galactica*," he said, are "as good as the three or four best shots in *Star Wars*."

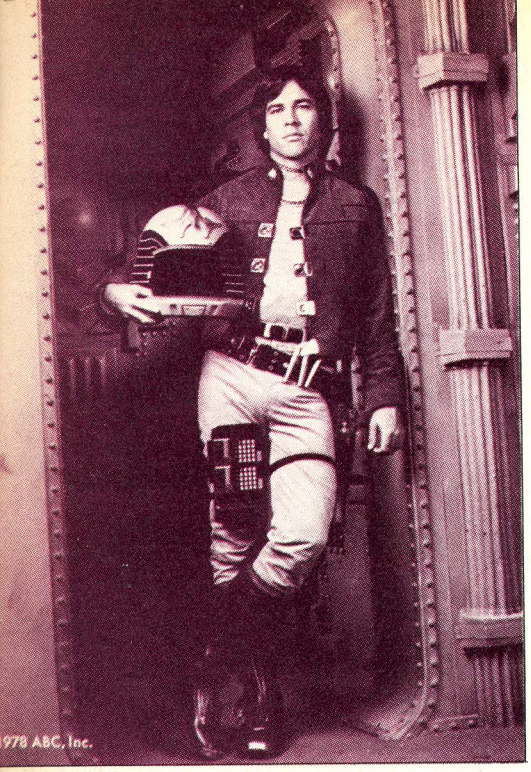
It seems safe to assume that never before in television history has one series spent so much of its budget on special effects; nor has the importance of special effects previously led to the *effects man* being made overall producer to insure artistic integration of the work. Following the completion of the three-hour pilot (and the stocking of a vast library of special effects which are to be used repeatedly) Dykstra was relieved of producing duties. Larson then hired another science-fiction luminary to be his principal producer — Leslie Stevens, who was the fountainhead of *The Outer Limits*. (Stevens is also assisting Larson on Universal's other new space fantasy, *Buck Rogers*.)

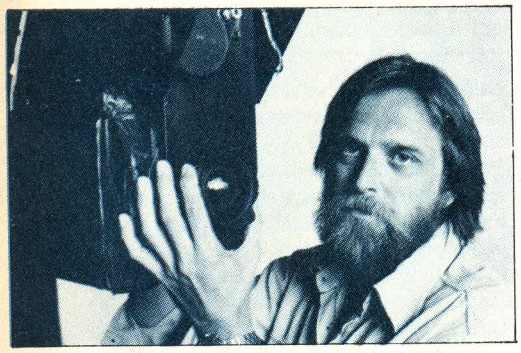
Dykstra continued to concentrate on special effects — more stock shots and the individual effects needed for each show. From persistent reports, however, it seems likely that by the time these words are read, John Dykstra will no longer be associated with the project. It is expected that Dykstra will be offered the opportunity to continue as head of special effects, and that he will turn it down — as soon as the seventh hour of his original commitment is finished.

As Dennis Muren puts it, "*Galactica* is a labor of love, and we're getting paid for it; but it will be nice to get on to other things." For Muren, "other things" includes special effects photography for *Star Wars II*, which begins this fall at a new installation in San Francisco. For Dykstra, "other things" probably means moving into the sphere of full motion-picture production (not just special effects). He and associate Robert Shepherd are currently shopping for scripts and novels-to-convert for the first of their productions. (*Star Wars II* will be overseen by Brian Johnson, who did effects for *Space: 1999*.)

Regarding Dykstra's departure from *Galactica*, an ABC spokesman said, "In any case, his credit will always appear, as *creator* of *Galactica* special effects."

Galactica is unusual — and unusually expensive — on many levels, other than special effects. The cast of ten regulars, including highly-paid Lorne Green, should be compared with the casts of three or four "in" shows like *The Rockford Files, Baretta, Quincy, and Project U.F.O.* And take note of the location shooting —





Above middle: John Dykstra at the lens of his "Dykstraflex" camera developed for Star Wars. Above: Cylon warrior rests during a break in the action.

Photos: © 1978 ABC

Above: Insectoid Ovions lay a human "fly-trap" to catch the survivors of the Cylon devastation. Upper left: Richard Hatch plays Lorne Greene's son, Captain Apollo. Says the young actor of the TV series: "Most companies have to continuously cut corners, settle for less than the best—not *Battlestar Galactica*."

Egypt, for instance, where a second-unit crew went to photograph the ruins at Luxor to represent the crumbled civilization on the planet from which all human life in the galaxy has migrated. This second unit was busy at a time when *Galactica* was already tying up five of Universal's biggest sound stages.

And the armies of exceptionally fine costumes come from exceptionally expensive Jean-Pierre Dorleac, a world-famous designer.

Symphonic scores are not unique to television, but *Galactica*'s sweeping music by Stu Phillips was recorded by the Los Angeles Philharmonic — in the young tradition established by John Williams' Oscar-winning *Star Wars* score. Larson claims he would have used a symphonic score anyway, though, because he sees *Galactica* as myth and Biblical allegory, very classical at its literary core.

"I started to cry when I first heard the score," Larson said; "it's so beautiful." Larson's earliest career — before he became a TV writer and then a producer — was in the music business. (He was one of the Four Freshmen.)

Once all the charges of copyright infringement and the other legal elbowing have subsided, and once other modern space fantasies like *Buck Rogers, Star Trek—the Motion Picture, Starcrash,* and *Flash Gordon* have come out to keep *Galactica* company, it will be more evident that *Galactica* was innovative in many ways all its own — not the least of which is its courageous, almost carefree use of funds in the hope of bringing to the public a TV fantasy of unparalleled quality. And some of the daring can be seen in things that neither zoom, blast, flash, or explode. When, since the days of *The Untouchables*, have we seen such exciting wholesale slaughter on our livingroom screens? And it happened during the very season when the networks have been bragging that at last they have censored physical conflict from the screen. The full extent of the ramifications of a successful *Galactica* on TV programming is yet to be seen — but it will certainly be interesting to watch.

Passive Solar Systems

(Continued from page 38)

order to improve on the age-old thermal mass concept. Based on the same organic process that turns water to ice, phase change materials keep comfortable temperature levels by absorbing and storing excess heat. When the room cools beyond the comfort zone, the stored heat radiates back into the living space.

In today's world, insulation and window coverings are the most essential parts of any passive solar system. Containing heat in a room is accomplished largely through window coverings, since the single biggest energy waster in modern-day buildings is heat loss through windows. One window covering now being used in Florida is a special clear film, inserted within *thermopane* (a special type of double-paned glass with a layer of air between the pane to ensure extra insulation) or applied to existing windows. This clear film allows for good visibility for residents who enjoy window gazing but also prevents cool or warm air (depending on the season) from escaping. Heat flow through windows can be c~~trolled by different types of movable in: ation, reflectors and temperature-sensitive optical shutters.

Another new and distinctive passive solar design currently coming into its own is the *roof pond*; a unit which can either consist of an open pond filled with water or a series of waterfilled plastic bags housed on a roof. California scientist Harold Hay designed a roof pond system — which he calls "Skytherm" — for his own house in Atascadero. The flat roof is covered with large plastic bags of water that absorb heat and radiate it through a metal ceiling to the rest of the house. On cold nights, movable insulation panels cover the pond to prevent heat loss. In hot weather, the pond is covered during the day and opened at night. During the hot summer nights, the open pond radiates heat from the house into the evening sky. An ultra-modern energy-saving technique based upon tried-and-true common sense.

Passive solar systems, if used to their fullest potential, can save more than 60% of the energy now used in heating and cooling conventional buildings. Looking ahead, it's possible for the up-and-coming passive systems to be combined with economical photovoltaics (systems which convert sunlight directly into electricity) for *total* energy-efficient structures.

Meanwhile, the embryonic passive solar movement continues to gain momentum; slowly but surely influencing the shape of our structural environment to come. As industries and nations argue over new sources of energy and lack of same, the logical passive solar school of supporters quietly offers the ultimate hope for the future: an energy-saving combination of common-sense efficiency and a new and creative approach to building design.

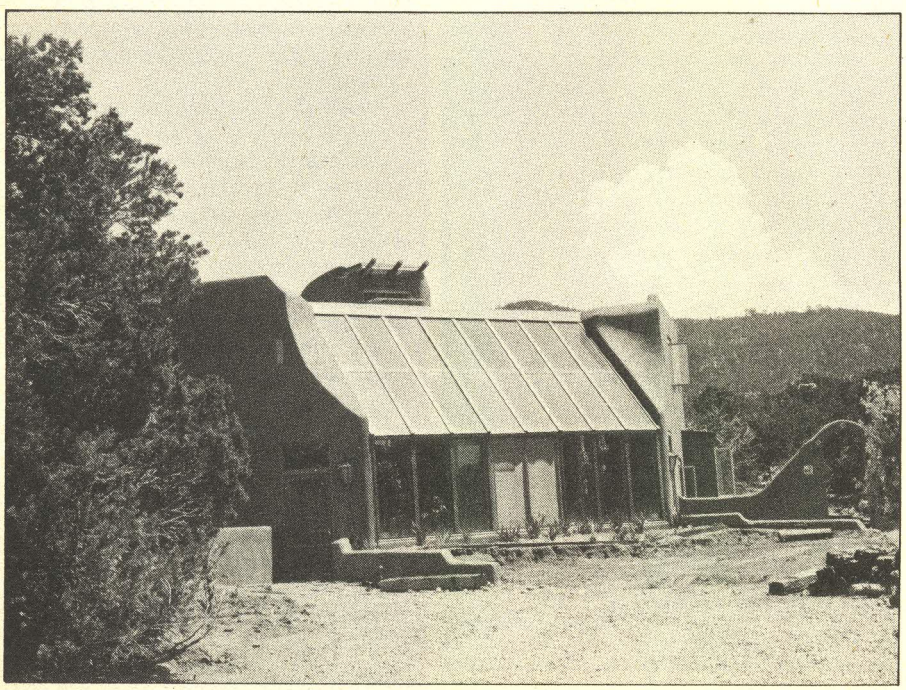
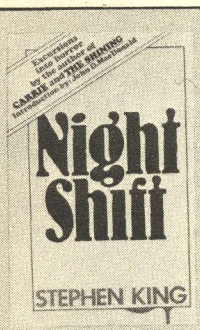


Photo: Sandia Laboratories

The greenhouse windows in this Santa Fe house admit heat and the adobe walls act as insulation and heat storage. Rock beds under the house store and radiate heat for additional warmth, keeping utility bills to the bare minimum.



Night Shift
By Steven King

($8.95 in hardcover from Doubleday)

Steven King writes short, monster-filled horror stories with no punches pulled. The first collection, which is called *Night Shift*, is worth its weight in chills. While this long work is padded with all manner of human insight, these short pieces are of a pessimistic, frightening kind. While the protagonists occasionally wind up winners, the best they can do is commit suicide.

Steven King also writes long, psychology-filled horror novels. His *Carrie* was made into a wildly successfull film directed by Brian DePalma. Stanley Kubrick is presently producing his latest best-seller, *The Shining*, in England. King's second book, *Salem's Lot*, sandwiched between these two, has been called "The *War and Peace* of Vampire stories." It too has been bought for movie adaptation, but its large scope (an entire town falls under the villain's spell) has defeated any number of screenwriters, King included.

In *Night Shift* evil is represented by a wild group of hell-spawned, extraterrestrials and all-too-human creatures, almost all working without the benefit of rational explanations. Giant mutated rats develop into gross bats in the cellar of a factory, an Emperor worm lives beneath a satanistic church tended to by corpses and even a team of death-dealing eyes start growing across an astronaut's body.

Somehow, through it all King manages to make you care what happens to his various victims and, in the case of his best stories, like "The Mangler," "Sometimes They Come Back" and "The Last Rung On The Ladder," he even gets you to believe. Beyond the "cackle quotient," King's work should be of interest to story stylists, since he's one of the best, and ecology people, since he's the last of a vanishing breed — a classic storyteller.

Ricky Moocher

The Purple Dragon Doc Savage #91
By Kenneth Robeson

($1.25 in paperback from Bantam Books)

He's tall, gold and handsome. He has bronze skin, incredible strength and he whirs when he thinks. He's Doctor Clark Savage, Jr. and he's back in action again! This new soft-cover volume celebrates more than Doc's entry into the "nineties," it is also a triumphant revival of sorts.

Bantam Books, thinking that the ninety previous adventures culled from the *Doc Savage* pulp magazine of the thirties and forties had sufficiently saturated the market, suspended publication of Savage's further exploits. "What we didn't realize," Marc Jaffe, Bantam Senior Vice President and Editorial Director, admits, "was what a loyal following Doc had and how many readers we were disappointing." In other words, virtually thousands of complaints poured in when the termination was discovered.

"We're back in the Doc Savage business now," Jaffe announces, "literally by public demand! And we're delighted to be there, too." Savage's return chronicles his fight against an evil fiend who's brainwashing the alumni of Doc's College for Criminals back to their evil ways. Another demon who also has a method to bring the dead to life and a monstrous creation which warps minds . . . The Purple Dragon.

Along with Doc, naturally, are his team of aides, the Fabulous Five, and also naturally, the sub-plot concentrates on the rivalry between the ape-like assistant Monk and the crew's lawyer, Ham. So if you're in the mood for some fast, colorful action in a neat package, this new Doc Savage adventure would be better than a month of *Eight is Enough*. Welcome back, Doc. May your reign reach ninety more.

Ricky Moocher

Shuttle Into Space
By G. Harry Stine

($4.95 in trade paperback from Follet Publishing Co.)

Poised on a launch pad at Cape Canaveral, the space shuttle *Enterprise* points skyward, ready to soar into space on another routine trip in the 1980s. Only on this flight, you're going along—not as a sightseeing passenger but as a working scientist determined to test out your invention, "space wood," in a zero-gravity laboratory.

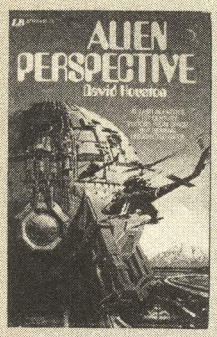
G. Harry Stine has written an introduction to the new space shuttle system which not only provides the reader with a simulated, first-hand spaceflight experience, but manages to serve as a lively introduction to the coming era of routine space travel and space industrialization. Stine, author of *The Third Industrial Revolution* (the first and only book to date on space industrialization), is well versed in both technical aspects of the space shuttle and the possibilities and promise of commercial operations in space. A veteran aerospace engineer, Stine is a prime consultant to NASA on space industrialization studies.

Shuttle Into Space picks up the action the night before your first launch, as you excitedly anticipate the events of the next day, and closes with a successful landing on the three-mile strip at Cape Canaveral. After one day in orbit, you've grasped the difference between a pilot astronaut and a mission specialist, and you've completed your "space wood" experiments.

The experience is further enriched by 24 color plates—paintings depicting the shuttle in nearly every stage of operation. The paintings were done by Rockwell International, the main builder of the space shuttle. A helpful glossary clues readers in on bits of technical data and space slang.

Drawing on his extensive research and indulging in intelligent speculation, Stine manages to convey the experience of flying aboard the shuttle. If the "you are there" gimmick becomes a little awkward at times, it's easy to forgive. Stine has done a masterful job of explaining a relatively complicated concept in an understandable format.

Robin Snelson



Alien Perspective
by David Houston

($1.75 paperback from Leisure Books, Norden Publications)

In his first science-fiction novel David Houston establishes himself as an important writer, one who has mastered the difficult mix of adventure, suspense, philosophy and science speculation.

Alien Perspective is not fantasy, nor does it raise myriad mystical questions the author is incapable of answering. It is a feet-on-the-ground extrapolative scenario for contact with alien beings in the setting of Earth about 75 years into the future.

The story begins with an impending tragedy aboard one of two alien ships exploring the vicinity of, but not particularly interested in, Earth. But perhaps Earth can help avert the tragedy. Perhaps Earth hosts a godlike superior race for whom a solution to the problem is child's play.

The leader of the afflicted ship takes a terrible risk: if Earth cannot solve his problem, then Earth will be forced to share in the tragedy; all life on the planet will have to be exterminated.

Meanwhile, on Earth — an Earth of greater moral and economic freedom than we enjoy today, an Earth of electromotive sledways, vest-pocket communications, personal helicopters, space colonies under construction, rapid cultural change, successes and failures — opinion is vastly split on the question of how to receive our approaching visitors.

NASA scientist William Reid — brilliant but not very good at dealing with the rest of the human race — tries to establish communication with the aliens. He has the help of spirited Gari Copalin, and the hinderance of her father, a U.S. Senator intent upon withdrawing Reid's operating funds. A romantic triangle involves charismatic astronaut Bud Sullivan, who, as it turns out, makes the first horrifying contact with the aliens.

Add a religious fanatic hell-bent on doing everything wrong — with the support of millions and an unlimited bank account. Add conflicts between the aliens themselves. Add a time limit and an ultimatum delivered neither by humans nor aliens but by the laws of nature . . .

The marvelously structured drama sets up a complicated web of life-and-death problems — not based on an "attack of monsters from outer space," but built around rational problems among thinking (but very different) beings. The reader sees a colossal crisis from multiple points of view and, in the process, has his eyes opened and his mind stretched.

The surprises appear constantly, and the finale is an amazing confrontation of enormous proportions. No one will put the book down unsatisfied . . . except, perhaps, from wanting more of the dramatic visions of David Houston.

Kerry O'Quinn

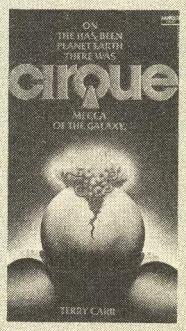
The Way The Future Was—A Memoir
by Frederik Pohl
($8.95 in hardcover from Del Rey)

When Frederik Pohl was ten years old he spotted a battered magazine entitled *Science Wonder Stories Quarterly*. The magazine, featuring a scaly green monster on the cover, mesmerized the young reader and before long Pohl was hooked on science fiction. In the years following that chance meeting the boy grew to manhood, becoming a die-hard fan, Futurian, Hugo Award-winning author, editor, respected anthologist and literary agent in the process. Now, almost fifty years since the SF bug bit him, Pohl looks back with fondness on his romance with science fiction and recounts how it was during the genre's formative years.

The Way The Future Was is geared towards an admittedly select audience, but for those orthodox SF fanatics who are looking for inside information, the book provides an ample amount of juicy tales. Present and accounted for in Pohl's wanderings down memory lane are young Isaac Asimov, Ray Bradbury, John Campbell, Damon Knight, Cyril Kornbluth and nearly every larger-than-life SF figure that ever existed in America.

Chock-full of fascinating info, the book is written lovingly, with the prose swinging casually from exuberant wonder to unbridled wit.

Timothy Lund



Cirque
by Terry Carr

($1.75 in paperback from Fawcett Crest)

Terry Carr has edited many fine volumes of science fiction over the years, but it is not often that he writes a novel of his own. *Cirque* was worth waiting for.

The city of Cirque exists on a future Earth, long after humanity has spread its seed among the stars. The circular city is a religious mecca built in terraced levels around the enormous Abyss in its center — so ancient that even the myth of its origin has been lost over the years. For untold millennia the leaders of Cirque's myriad religions have expiated their followers' sins by "casting them out" into the Abyss. They have also been tossing countless tons of garbage and refuse into the supposedly bottomless pit during the course of the centuries.

Basically, Earth is a quiet planet in this future age. Too far from the galactic hub, it has been left behind to develop into a calm, backwater planet of peace. And then one day a visitor arrives by spaceship. It is a millipede from Aldebaran who has come to witness an event that only he knows will take place . . . An event that will transform the people and the nature of Cirque for all time. (And that is all I will give away about the story.)

Cirque is not, strictly speaking, science fiction. It is a mythic fantasy (in the round) that examines the nature and power of self, the unity of mind and the structure and fabric of time. Carr's triumph is that he is able to do this with clear, poetic and classically beautiful images. *Cirque* is a triumph of love over hate, good over evil, unity over division, light over dark.

In short, *Cirque* is a brilliant novel. Read it.

Howard Zimmerman

Frank Frazetta's Barbarian Lives!

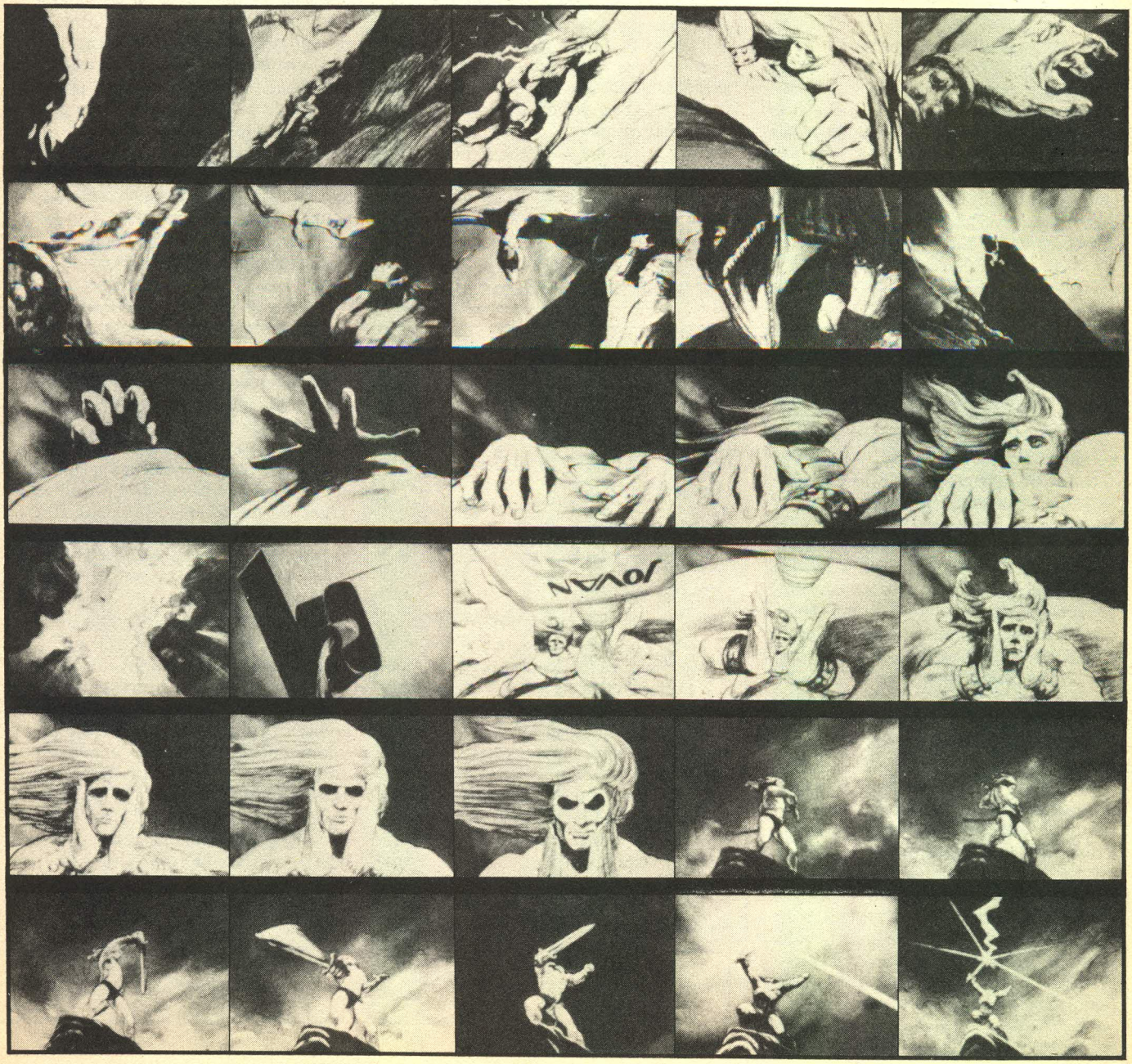
An audacious TV commercial breathes life into the famous artist's creations.

By RICHARD MEYERS

Here's the problem: you are a high-paid advertising executive with one of the biggest and best agencies in the country. One of your new accounts has a product that is just crying out for a new and innovative campaign. Unfortunately not just any new and innovative tact will do since the product is called Jovan's Sex Appeal for Men Fragrance. How do you embody a supremely macho image in a print ad and 30-second commercial without shocking the audience or getting accused of blatant sexist advertising?

The answer J. Walter Thompson of Chicago came up with was fantasy animation. What could be less controversial and more exciting than a brawny barbarian of the Frazetta type embodying the musky masculinity of Jovan's product? And who better to picture the mighty warrior than Frazetta himself? The noted fantasy artist was contacted after one of the Thompson men went through samples of his work and chose "Against the Gods" as exactly what they were looking for. The agency acquired the commercial rights for the piece and used it with added copy for the

(Continued on page 74)



World-famous animator Richard Williams provided FUTURE with this storyboard breakdown. His animated barbarian is quite effective.

Take an existing Frazetta work, "Against the Gods," add Dick William's animation and what happens? Visual dynamite!

Animating the Gods

Takashi's Metamorphoses

Above: Phaethon, jealous of the god Apollo's fiery job, makes off with the chariot of the Sun.

By RICHARD MEYERS

Many people seem to think that science speculation began with Edgar Allan Poe or H.G. Wells in the early part of the Twentieth Century. In reality it can be said that SF dates as far back as 43 B.C. when the Roman Empire still flourished and the likes of Publius Ovidius Naso's poetry was all the rage. More commonly known as Ovid, he produced a massive history in verse called *Metamorphoses* which chronicled man's advancement through legend from the dawn of time to his Roman present.

An equal number of people seem to think that the art of animation began and ended with Disney during the last forty years. However, there are eager and talented artists producing landmark work in the field today, including Ralph Bakshi, Richard Williams, Phil Kimmelman, and a designer/writer/actor/director/cartoonist from Japan named Takashi. Takashi is a literature buff with great vision and it was only a matter of time before Ovid's conception and Takashi's talent got together.

"My interest has always been to make something out of nothing," says the California-based auteur. "I grew up in the time of nothingness, World War II in Japan and everything else, so I produced toys out of charcoal. Which is not good or bad, worse or better, it's just the times. Now I produce movies."

It was a long trail to his present production position. After having secured a notable reputation in Japan as a designer, Takashi arrived in Hollywood and during the last fifteen years worked his way up the animation ladder, via freelance, contributing to almost every animation studio.

"I think I worked at all of them except Disney, and I probably stayed the longest at Hanna-Barbera. My last capacity there was as a supervisor of some sort. Then I met the Japanese businessmen who created Sanrio." Established in the early sixties, the Sanrio Corporation became one of Japan's largest merchandising concerns until they opened a California office in 1975.

"They said they were interested in making motion pictures," Takashi remembers, "but I don't think they really had a grasp on what it would take financially or technically." Even so, Sanrio's first film effort, the live action *Who Are The DeBolts And Where Did They Get Nineteen Kids?*, won last year's Academy Award for Best Documentary Feature. Subsequently, Takashi found himself headed back to Japan.

"I actually went back to train a group of animators for Sanrio in order to open up a bigger animation industry for them," the creative cartoonist recalls. "But there was no real incentive, they didn't have any project to work on. I was personally interested in doing mythology for quite some time and I thought maybe the magic of an animated anthology might make it work. That turned out to be not quite true."

In the meantime, however, Takashi's crew had the groundwork to produce from and a possibly profitable exercise in adapting classic animation techniques. "Recently, people haven't really tried," Takashi admits. "Animation, unlike live action, depends on the growth of the artist. It is a group effort — we don't have the same 'language' the other arts have. So I brought a crew back to California and formed a school for the artists."

Out of this educational experience *Metamorphoses* was born, an 85-minute, six-part cartoon with no dialogue. Out of that came a six-track Dolby stereo soundtrack featuring original compositions and performances by Joan Baez, Billy (*The UFO Incident*) Goldenberg, The Rolling Stones, Michael Young, The Pointer Sisters and others.

"It took some running around," Takashi says, "going around the world practically, to get these people, but it was worth it. Music has been doing translations for years. In the non-English speaking countries they will still enjoy pop music."

Takashi's attention to detail and concern for the development of his art took its monetary toll, however. By the end of production — a grueling three years of work

Metamorphoses

A Sanrio Presentation, 1978. 85 minutes. Produced by Terry Ogisu, Hiro Tsugawa and Takashi. Screen Treatment and direction by Takashi. Musical performances by Joan Baez, Mick Jagger and The Rolling Stones and The Pointer Sisters. Music by Billy Goldenberg, Jim Studer, Steve Tosh and Michael Young. Sequences directed by Jerry Eisenberg, Richard Huebner, Sadao Miyamoto, Amby Paliwoda, Ray Patterson, Manny Perez, George Singer and Stan Walsh.

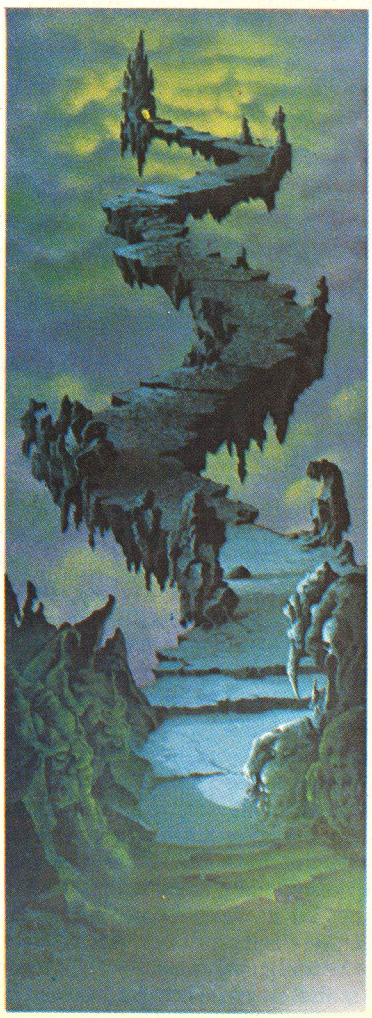
— the initial budget of three million dollars had doubled and Takashi had to admit he was not entirely successful.

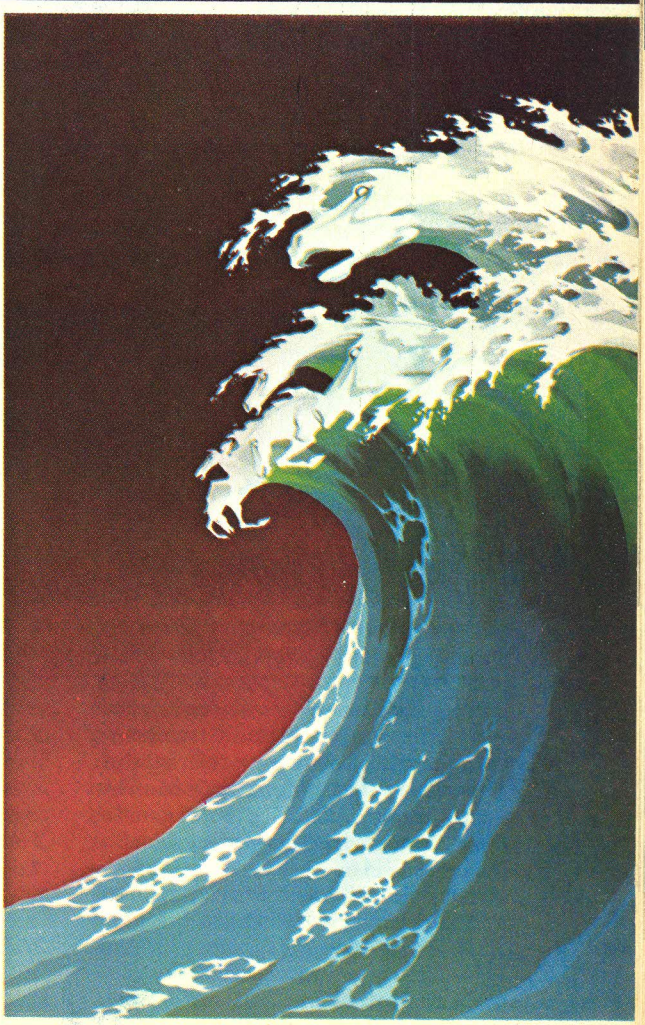
"Try as we might, we cannot duplicate what Disney had been able to do thirty years ago. We're talking about a huge economic jump for one thing. Six million is not worth as much now. Second, I had difficulty controlling the mood of the picture with eight 'Sequence Directors.' This was a practice in freedom which turned out to be defeating its purpose. They were no longer eager to create. I tried to remedy that sad condition but time and money limited us."

Takashi's feelings of personal failure aside, *Metamorphoses* has since been favorably received on the West Coast. Yet, it would never have been possible without the veritable army of talented contributors. Among the various production designers, animators and supervisors — a crew that sometimes numbered over 250 — were Mike Ploog, famed for his comic and *Wizards* work, Ray Patterson, who worked on *Fantasia* and *Dumbo,* Ken O'Brien, a Disney 20-year veteran, and so many others that the credits look like a cartoonists' hall of fame.

Presently *Metamorphoses* has been pulled from national distribution to see if it can be made "more accessible" to family audiences. "We have built-in limitations," Takashi says with an air of resignation, "but I think we really made a great attempt. The film has been called 'Disneyesque,' and been compared to *Fantasia,* but maybe the task from the start was too large and too difficult for a motion picture. But for the experiment we attempted I think we've been rather successful."

Most animation lovers and film critics agree, terming the film a virtual textbook of animation: past, present and future. *Metamorphoses* is but the first step toward pulling cartoons out of the "kids only" doldrums. F





Photos: © 1978 Sanrio Studios, courtesy Takashi

Above and going clockwise: the two animated figures for most of Metamorphoses' characters; a moment from the Creation sequence; and the House of Envy.

PART I

Operation Morning Star: The Unveiling of Venus

Pioneer-Venus 2 slams into the dense Venusian atmosphere at 25,900 miles per hour. The probes, protected against burn-up by carbon-phenolic heat shields, will have to withstand decelaration forces of up to 500 g's

Except for a spider spinning its web in a vent pipe nozzle, it had been a smooth countdown. Nevertheless, Science kept its fingers crossed when Atlas-Centaur AC-50, at 9:13 a.m. on May 20, roared off its pad at Complex 36A of Kennedy Space Center, Cape Canaveral.

Perched high atop the 150-ton rocket was *Pioneer-Venus 1*. All preprogrammed vehicle events occurred on schedule. Half an hour after liftoff, the spacecraft had separated from its Centaur stage and was speeding along at over 25,000 miles per hour on its seven-month journey to Venus. The first part of NASA's 1978 entry in the continuing assault on the Morning Star was on its way, to be followed in early August of this year by the second member of the *Pioneer-Venus* exploration team.

When the two robot explorers arrive at the Shrouded Planet in December 1978 to probe the cloudy atmosphere of the Morning and Evening Star of our sky, we may learn from their findings more about Earth itself. Planetary scientists believe that the study of weather processes on other worlds, especially on Venus, can help solve the mysteries of our own global climate

Jesco von Puttkamer is Program manager of Space Industrialization and Integrated Long Range Planning Studies at NASA. He is also the technical advisor for Paramount's forthcoming Star Trek *movie.*

and weather system. Foremost among these problems would be the worsening air pollution on Earth, and its potential dangers to humankind through the so-called "greenhouse" effect.

NASA is undertaking the double-barrelled *Pioneer* reconnaissance mission to the still deeply mysterious Venus as part of a continuing program of exploration of the inner planets of the solar system, after the landings of two *Viking* robots on Mars in July and September 1976. The Venus missions, actually involving a clutch of six separate space probes, represent the first U.S. space flight project undertaken solely for exploring the puzzling atmosphere of the cloudy planet by direct measurements on a planetary scale.

Pioneer-Venus 1, due to arrive at Venus on December 4 of this year, is an orbiter. The probe is packed with twelve scientific instruments, which include a cloud-penetrating, side-looking radar to provide (for the first time) a map of the Venus surface features not visible from Earth. It will be inserted by its solid propellant engine into an elliptic orbit inclined 75° to Venus' equator. Circling the planet at altitudes varying from 90,000 to 41,000 miles, the Orbiter will take 24 hours for one revolution, thus being "visible" to Earth's ground control stations at the same time each day.

Pioneer-Venus 2, a multi-probe spacecraft, will arrive at Venus five days after the Orbiter. For economy, its design utilizes the same basic "bus" as the Orbiter, but its arrival will be highly unusual. Almost three weeks earlier it will separate into a cluster of five different pieces: three small and one large atmospheric entry probes, plus the bus. The probes, protected against burn-up by carbon-phenolic heat shields, will slam into the dense atmosphere at 25,900 miles per hour, with deceleration forces up to 500 g's. But in true Kamikaze fashion, they are not required to survive impact after plunging through the atmosphere, radioing back measurements all the time.

Meanwhile, the Soviets, too, are readying two probes to Venus, expected to depart Earth in August.

All told, prior to the May 20 launch, Venus has been the target of 13 spacecraft — three were American and ten were Russian. The U.S. Venus spacecraft have probed the planet only in passing: such so-called fly-bys were conducted by *Mariner 2* in 1962, *Mariner 5* in 1967 and *Mariner 10* in 1974. The closest passage was *Mariner 5*, zooming by as near as 2,500 miles. The Soviet Union, too, has pursued an aggressive Venus exploration program. A total of eight *Venera* spacecraft have attempted the extremely difficult landing on the invisible surface of the planet since 1966, with the first successful landing in 1967 by *Venera 4.*

Venus . . . ah, what beauty in the heavens! Next to Sun and Moon, it is the brightest object in our sky, owing its brilliant countenance to its permanent cloud cover which reflects light like a mirror. In fact, its astronomical symbol is a mirror. On a clear day, it can be seen with the naked eye during broad daylight.

The priest-astronomers of the Maya Indians knew that Venus was both Evening and Morning Star, with an interval of 584 days between recurring Earth/Venus closest approaches (synodic period). In 2000 B.C. the Babylonians knew that the Evening and Morning Star were identical, and they assigned it to their Goddess Ishtar, calling it the "Mistress of the Heavens."

Since that time, Venus has become regarded in the vernacular as Star of Love and Fertility. The Phoenicians knew her as Astarte. The Greeks, much later, as Aphrodite. The Romans as Venus, the Chinese as *t'ai-peh,* the great white star, the Temple of Light. With the exception of India, where Venus is a masculine body (*'sukra* = the Gleaming), peoples of Earth always considered Venus to be associated with a goddess.

Like Mercury, the Sun's innermost planet, Venus moves along its path around Sol inside Earth's orbit. Seen from Earth, it remains close to the Sun at all times, but in the morning and evening sky it can move away from it far enough (up to 47°) to become the bright object known so well to us — an object of such startling brightness, in fact, that confused observers often report it as an "unidentified flying object."

On July 21, 1716, for example, its appearance caused wide-spread public excitement in London, leading English astronomer Halley to investigate the planet's radiometric properties. Even earlier, in May 1609, people in France marvelled at its appearance during daylight and later interpreted it as a sign auguring the assassination of King Henry IV. In 1789 Venus upset the citizenry of Paris and Emperor Napoleon I declared it his star of destiny. Yes, superstition has always in history been close on the heels of Venus, the refuge of people who couldn't explain how a gleaming star could be visible in the sky in broad daylight.

Prior to the first fly-by of a U.S. spacecraft, the *Mariner 2,* and the first radio measurements from Earth, Venus had had a long tradition, in the popular mind, of being habitable by humans and possibly being already inhabited by creatures generally like us, but probably somewhat more gracious and loveable.

Immanuel Kant wrote of a race of amorous humanoids dwelling on Venus. More recently, wishful thinking, pure speculation and deliberate as well as unconscious fraud, often taking the form of spectacularly audacious UFO accounts, populated Venus freely with intelligent beings, many of them — case in point, George Adamski — finding numerous gullible followers.

Today Venus is yielding its mysteries at a rapid pace to planetary spacecraft from Earth, and we know enough of it already to expect on its surface no life as we recognize it. In the early 1960s radio-astronomy measurements of microwaves emitted by Venus revealed that it is extremely hot. While it wasn't clear at first whether the radio emissions came from the surface or from the atmosphere, Carl Sagan predicted, as early as 1962, that Venus had an extremely hot surface. That was puzzling. While being closer to the Sun and thus exposed to about twice the energy influx as Earth, its high reflectivity should offset much of the increase in incoming radiation, resulting in a surface temperature not more than about 100° F hotter than Earth's surface. Instead, surface temperatures average around 900° F. The currently accepted explanation of this phenomenon invokes the "greenhouse" effect of an atmosphere rich in carbon dioxide which allows the passage of incoming solar radiation in the shorter wavelengths and essentially blocks the outflow of heat, which uses longer wavelengths. The heat is trapped. Not all scientists, however, are happy with this explanation. To some, the carbon dioxide content of the Venus atmosphere does not explain the runaway greenhouse effect.

At first the surprisingly high temperature of Venus was pitted against speculations involving various surface models ranging from steaming prehistoric jungles and swamps to dusty deserts, from carbonated seas to oceans of bubbling petroleum. Much early science fiction had depicted Venus as a swamp world. Most speculations proved wrong: Venus is not a water-covered prehistoric planet but a scorching dust bowl. In places, temperatures appear to be high enough to make the surface glow a dull red. If there is zinc on the surface, it would be molten in puddles, but most rocks remain solid.

(Part II will appear in FUTURE #7)

Art: NASA

The Mass-Driver

(continued from page 27)

millions of tons of Moon soil to a space-based chemical factory.

But there's another way to use the mass-driver: as a "reaction engine" to move things around *in space*. Imagine what would happen if the entire lunar mass-driver were suddenly uprooted and set free in space. If it still had a source of dirt to fill its buckets and continued to fling them off in one direction, the entire assembly would obey Newton's laws and move through space in the opposite direction. Thus, the mass-driver reaction engine.

Of course, O'Neill doesn't propose to use the same kind of mass-driver in space as he wants to use on the Moon. But the basic principle can be refined into a spaceworthy craft—a sort of tugboat which, owing to its penny-pinching virtues, could significantly speed up the progress of setting up a lunar base and getting on with ambitious construction projects elsewhere in space.

Right now there is no cheap way to get things to the Moon. The space shuttle will make it less expensive to achieve a low-Earth orbit—admittedly the toughest leg of the journey. That's where the mass-driver could take over. As soon as there is no gravity and no friction to interfere with its progress, the mass-driver's low-thrust, steady movement will do just fine in relaying goods from Earth orbit to Moon orbit or to a space manufacturing facility. Powered by sunlight and using whatever's available for "reaction mass" (the material thrown out the back), the mass-driver runs more cheaply than conventional chemical rockets.

Brian O'Leary, the former astronaut and current Princeton physicist working closely with O'Neill, has suggested that elaborate spacefaring mass-drivers—outfitted with built-in chemical factories—could be sent out to capture Earth-approaching asteroids. On the way back to the Earth-Moon system, the factory could begin processing the asteroids, which are believed to be rich in raw materials and natural resources not available on the Moon. It might take such a flying mining operation-cum-chemical plant three years to make the round trip, but it would return with a valuable catch.

Instead of crude buckets of dirt flying out the back, the spacefaring mass-driver could use liquid oxygen as its reaction mass. Oxygen is plentiful on the Moon—lunar soil samples contain 40% oxygen—and it will probably be a waste product of any chemical factory which processes lunar soil for building materials like aluminum and silicon.

A mass-driver could use *anything* for reaction mass—rocks, dirt, satellite detritus. . . asteroid-retrieving mass-drivers will likely chew up a small portion of their catch to provide fuel for the journey back. Oxygen looks like it will be in good supply at a later stage of space manufacturing development. And it's an especially desirable choice, since it would naturally disperse into molecular form—keeping the space environment as clean as possible.

But if the mass-driver is to be used early on as a ferry system from space shuttle territory to lunar orbit and beyond, it won't be able to rely on liquid oxygen for reaction mass. Therefore, ever budget-conscious O'Neill came up with a sensible recycling idea.

Each time the space shuttle flies into orbit, it "throws away" one of its parts—the giant external fuel tank, basically an empty

At the 1977 Princeton conference on space colonies, Kevin Fine explains the mass-driver model before it's demonstrated, while Professor Gerry O'Neill looks for a front row seat. Right: close-up of model "bucket."

Photo: Dr. Henry Kolm

Photos: courtesy Bill Wheaton

Above: mass-driver model builders (left to right) Eric Drexler, Jonah Garbus, Bill Snow, Kevin Fine, Dr. Henry Kolm and Bill Wheaton pose with a section of the first mass-driver model.

aluminum shell one half the length of a football field. When the rocket fuel it carries is all gone, just before the shuttle reaches orbit, the external tank will detach and drop back to Earth, presumably to burn up in the atmosphere or fall into the ocean.

But if the tanks were brought on up to orbit—as they easily could be just by sacrificing some payload space in the shuttle's cargo bay—O'Neill thinks the empty aluminum tanks could be ground into a fine powder. This plan would transform the only throwaway element of the space shuttle system into a valuable commodity: reaction mass to propel mass-drivers for the first few years of their tenure as tugboats in space. Until mass-drivers can switch over to using oxygen for propulsion, powdered shuttle fuel tanks will do just fine. Outer space environmentalists have little to worry about, because the dust trail left by mass-drivers would only amount to one percent of the normal micrometeorite population in the area.

Since Gerry O'Neill first imagined the mass-driver and began to consider its possibilities, some of the engineering and design has gotten underway. In 1976-77, O'Neill spent a year at MIT working with Dr. Henry Kolm—a physicist whose specialty is generating very intense magnetic fields for a variety of purposes. One of his projects was the MIT Magneplane—exactly the kind of high-speed ground transportation on which O'Neill based his lunar mass-driver idea.

Together with a group of MIT students who volunteered their brains and busywork for several months, Kolm and O'Neill built the first demonstration model of a mass-driver. That prototype mainly served to illustrate that the acceleration principles worked.

At the 1977 Princeton conference on space colonies, hosted by O'Neill and sponsored by NASA and the American Institute of Aeronautics and Astronautics, the mass-driver model was put through its paces. To the audience of scientists and space colony enthusiasts, the simple demonstration was an exciting symbol.

The "bucket" was dropped into its guideway, the current switched on and with one swift, almost simultaneous whoosh*bam*!, the bucket slammed into a solidly secured lead brick 32 feet away.

That first model, built with a couple of thousand dollars in seed money from NASA Advanced Programs and hours of time donated by the MIT students, was enough to convince NASA that the mass-driver is an option worth looking into. Now the NASA center in charge of developing new propulsion systems, Lewis Research Center in Cleveland, is funding further mass-driver studies. A second prototype is already under construction—at Princeton, research assistant Bill Snow heads up work on the mass-driver's guideway track being built in the physics lab, while at MIT, Professor Kolm and graduate student Kevin Fine are designing the bucket part of the mechanism.

At the moment, the level of NASA funding can't exactly be termed overenthusiastic. The $70,000 per year to Princeton and MIT barely covered the paperwork designing that had to be done. Some of the expensive materials going into the second model have been paid for by donations to O'Neill's Space Studies Institute—a non-profit group dedicated to furthering the High Frontier concepts of space colonies and solar power satellites. Bill Snow, who's designing the electrical circuits and actually putting the guideway together, managed to scavenge other parts from an experimental particle accelerator that was being disassembled.

When the second mass-driver model is completed, it will be much closer to an eventual working spacecraft or lunar launcher than the first model was. Number two will operate in a vacuum, emphasizing how the absence of air will permit a mass-driver to work. This time the bucket will actually be "levitated" off the guideway, not by ESP, but by generating a very intense magnetic field to suspend the bucket in the guideway. Levitating the bucket will also reduce friction and drag—and permit higher speeds.

Mass-driver II, in addition to demonstrating how fast it can speed something up (they're shooting for 350 miles per hour in the space of five meters), will also show how efficiently it can slow the same thing down. This time, instead of stopping it with the rather low-technology, lead brick method, the bucket will be slowed by the same sort of electromagnetic impulses used to accelerate it.

In practice, as soon as the bucket is dropped into one end of the new guideway it will seem to magically and quietly appear at the other end, 10 meters away. In reality, it will accelerate up to 350 m.p.h. over the first five meters of track and decelerate from that speed over the final five meters of the guideway.

The whoosh*bam*! will be missed. But when the second mass-driver is demonstrated at the next Princeton conference scheduled for May of 1979, its creators and builders hope the message will be loud and clear: it still works.

And if the mass-driver really works, maybe it will turn out that O'Neill is right about all the rest.

(continued from page 35)

was given the go-ahead. The production began filming on May 4, creating some rather unique problems for the cast and crew. "We had 84 speaking parts, so we interviewed a lot of actors. We went for quality actors as opposed to celluloid personalities. There wasn't a soul we stumbled upon that wasn't aware of the book.

"But the script has a language all its own that sometimes confused the actors. I mean, beyond the 'engaging' and the 'oh Ford-ing' and the making of the sign of the T. There are different walks for the Gammas, Deltas and Epsilons (three of the lower orders of society created by the government; a prefabricated working class). They all look alike. Alphas and Betas (the higher orders) look differently but all dress alike. It was great fun deciding who would be an Alpha plus or a Beta minus. We finally worked out a whole scheme of height, color of uniforms, walk, etc."

Sometimes this futuristic system of regimentation startled the actors involved. "Ron O'Neal and Trish O'Neill didn't start working on the set until the fourth week," Babbin says. "They arrived and, honestly, I've never seen two more nervous actors in my life. The cast and crew had gotten so into the *BNW* way of life and the terminology, that we were talking in terms that Ron and Trish just couldn't understand. We were talking about 'feelies' and 'computopix.' They suddenly realized that they were really entering a whole new world, literally. We had to sit down with them and say, 'Oh yes. This is the Brave New World and this is how people act in the Brave New World. People don't touch each other. There's no handshaking.' "

The creation of the artificial caste system was a visual problem that the cast and crew surmounted amiably. "All the Epsilons were extras," Babbin reveals. "We used masks on them so they looked exactly alike. They were all five feet tall. Technically I know they should have been dwarfs, but we didn't have the time or money to hunt for really tiny people. They're nice and grotesque looking, however, dressed in grey.

"The Deltas are all five foot four and have pale skin with black circles around their eyes. They dress in blue with pink caps to hide their hair color. We did this for expediency, but it also works aesthetically. During the riot when John throws the soma (tranquilizer drug) away . . . well, when you see fifty people with white skin and black circles under their eyes chanting 'soma, soma, soma,' it's pretty effective.

"The creation of the Gammas was a fluke. There are two actors, Patrick Cronin and Beatrice Colen, who happen to be married to each other and look alike . . . like the Campbell soup twins. They both have curly, blonde hair. They are both excellent actors, so we made them our prototype Gammas. They do all the Gamma speaking parts. Since they're both five foot eight, we made all the Gammas that size, hiring extras and dressing them like Pat and Beatrice in mustard-colored suits.

"The Alphas and Betas are incredibly clean-cut. Short hair, no facial hair on any of the men in the Brave New World. The one beard is on John Savage. He had to look different than the rest of the savages and the entire civilization. I wanted him to look a little like the nineteenth-century, idealized look of Christ.

"The Alpha and Beta women had all their hair pulled back. The uniforms are sort of shrimp colored for the Betas and soft yellow for the Alphas. It's a warm, clean look; no jewelry. Everyone wears a wrist band like the one you'd wear if you were in a hospital. Everything is streamlined, simplistic.

"You open a door with a handprint mit. If the hand fits the door, it opens. If not, a buzzer goes off and you must wait to be *allowed* in. Cameras consist of lenses hooked up to a master camera somewhere where the actual development is done. We didn't get into this with an emphasis on scientific technology. It's about an environment — it's people."

Babbin's concept of this sleek environment did create some practical difficulties during the filming, mostly humorous ones. "We wanted a totally controlled environment," she stressess, "devoid of outside involvement. Of course we had flies all over the set that we had to chase around. On the sound stage we could hear birds chirping, cats meowing and crickets cricketing. We had to erase all that noise because, in the Brave New World, we wanted the hum of the city to be there constantly."

For the primitive Savage-land, the *BNW* team was equally taxed creatively, coming up with an equally inventive visualization. "We had to shoot that on the back lot. Tom found something called 'Mexican Street.' Any resemblence between the original street and what we finally filmed is purely coincidental. Tom made it look like a trailer camp gone to seed; lots of rubble. This is one of the few scenes where you see our prizes of today beaten. You see smashed TV sets, broken, refrigerators, totally useless luxury items."

Filming lasted 41 days and, now, with *Brave New World* complete, producer Babbin is at a loss to describe it using any *one* "label," including the term "science fiction." In her opinion, the show is one-of-a-kind. "It's different from most television in that it's a show you have to *listen to* as well as watch," she muses. "It's witty. It's intelligent. It's not a show that's going to be Mickey Mouse where the violins mean a love scene is coming and the drums mean danger. There's going to be very little music in it. The sound of the city, the hum, will be the backdrop.

"The look of the show is visually impressive, beautiful. The city is soothing; pale blue, lavender and silver. The show will startle a lot of people. But, you know, people who are expecting *Star Wars* can forget it. There's no hardware. We don't even have one piece of futuristic transportation. It wasn't important to us to show how people got from place to place. We were more interested in the people themselves.

"It's a pretty odd show, I guess. We don't start off with any shooting or anyone getting blown up. There is exactly one kiss in the entire four hours so, for all that 'engaging,' it's hardly a sexual outing. People aren't going to get a lot of gimmickry or special effects. We have a very strange production, engrossing, with little children singing, 'death is perfect, death is good.'

"The amazing thing, in retrospect, is to realize just how close Huxley was to reality. When you pick up a newspaper today you find test tube babies and books written on alleged clones. All we're waiting for now is legalized soma for people under stress and amphetapeps for people who are run-down."

Babbin slows down slightly and reflects on the importance of the upcoming show. Science-fiction literature presented in a literate, intelligent way. A first surely, but will it appeal to a mass audience? "Gee, anything I say will sound like something that will turn people off," Babbin laughs. "I think it's an important show. It's about relationships, about real people, about the world around us and what's wrong with it. It's a funny show, although NBC forbids us to use the evil word 'satire,' but there's a warning present as well; a warning that should be heeded about what we are and where we're going."

Babbin pauses thoughtfully. "I hope we get an audience so we can continue to present this sort of drama. I'd love to try Huxley again." Catching herself in the act of sounding a bit "highbrow," the producer adds wryly, "But people want to see things like *Charlie's Angels,* right? Well, tell 'em that we even have a *Charlies Angel's* scene. At one point we had three female assistants of Thomas' run onto camera at once. I turned to our director, Burt, and patted him on the back. 'GREAT *Charlie's Angels* scene.' "

Even in the *Brave New World,* it would seem, ratings hold the key to Utopian existence.

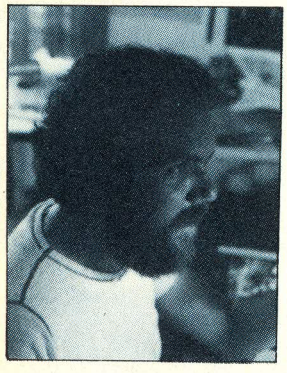


Photo: Christina Rushforth

To Canvass The Solar System:

An Interview With Astronomical Artist

Ron Miller

By MICHAEL DOBSON

Ron Miller lives in deep space.

Although Ron and his wife Judy officially reside in suburban Woodbridge, Virginia, it is clear from Miller's hobbies and professional lifestyle that his mind dwells beyond the boundaries of Earth. Ron is an astronomical artist, a painter of spacescapes. In fact, in some circles he is considered to be *the* young space artist on the rise. Yet despite the praise, the recognition, Ron likes to consider himself a space fan, someone who simply lives and breathes his work.

Puttering through his home, Ron casually points to a skeletal hand peeking out from a crack in the ceiling near a wall full of space art. "You can write that our house is filled with Victorian clutter," he chuckles, "with a touch of Edgar Allan Poe." There is indeed *clutter* in the Miller household, but it is some of the most out-of-this-world debris ever witnessed by man or fan.

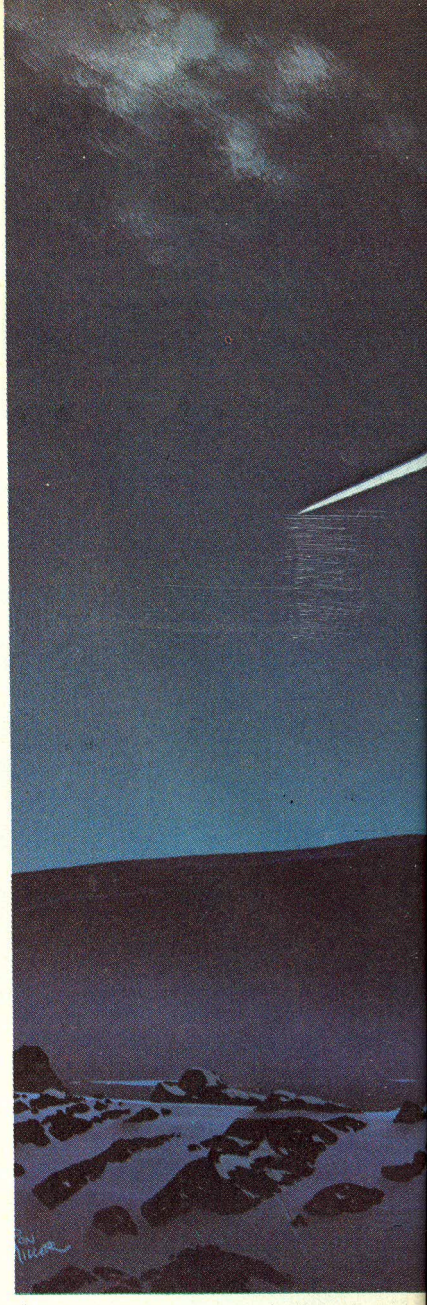
The artist's abode is a gallery of science-fiction and fantasy memorabilia. As well as being an accomplished space painter, Ron is an avid collector, owning over a hundred works by such masters as Chesley Bonestell, Ludek Pesek, Jack Shoenherr, Tim Kirk and Jeff Jones. More than a few shelves of his already-crowded bookcases overflow with vintage model spacecraft as well. "I own several of the early Disney kits," Ron beams proudly, "including the space station model.

"I'm also a big fan of Jules Verne. I own about 230 Verne books, which is interesting when you realize he only wrote 66. I've got 60 different Verne titles, and most of them in French and German as well as English. I also helped design the *From The Earth To The Moon* projectile in the Air and Space Museum's Gallery of Rocketry and Space Flight. One of my ambitions is to illustrate several Verne novels and perhaps do a *Verne Companion* book, which would give background information and maps on each of his novels."

It is apparent from Miller's non-stop interest in the world outside Earth's aura that his devotion to space art is total. Although painting professionally for only a few years, his work for the National Air and Space Museum is legend and his cur-

Above: Meteor shower over a 19th-Century English village.


RON MILLER




RON MILLER

Above left: Watercolor fantasy painted for a friend. Above: Typical example of Miller's astronomical art, "Exploring Titan." Left: Realism & fantasy blend in Miller's vision of the next ice age. Painting was done for *Smithsonian* magazine.

rent freelance spacescapes are without peer. Logically, his current status as artist extraordinaire is the extention of a childhood dream.

"I've been interested in art and space travel for as long as I can remember," says the Minnesota-born Miller. "I drew spaceships in first grade rather than pay attention to the teacher. Oddly enough, though, I didn't turn to space art professionally for many years. I *did* decide to become an artist early in life and was very influenced by Albert Bierstadt, James Whistler and lots of 19th Century British artists. There's a lot of pre-Raphaelite influence in my work."

During the sixties, Ron attended Ohio's Columbus College of Art and Design (also the alma mater of Frank Kelly Freas and Bob McCall) and earned a Bachelor of Fine Arts degree in illustration in 1970. It was during his college years that he began to take an artistic interest in science-fiction and space graphics. "I first heard of science-fiction fandom in 1967," he recalls. "I did some fanzine art for my own *Dakkar,*(a Verne publication), Linda Bushyager's *Granfalloon* and a few others. I even got involved in a short-term fan feud about art. Eventually there was an article in *Granfalloon* called 'To Hell With Ron Miller!' "

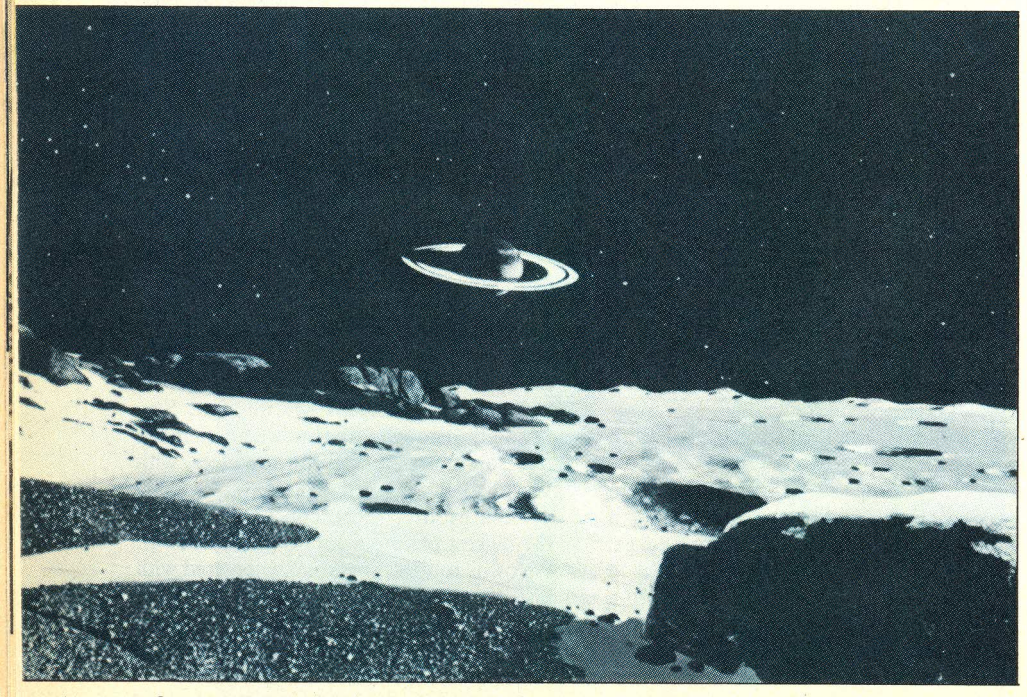
Never thinking to mix personal and professional interests, Ron embarked on a rather mundane art career after college, working for three advertising art studios in Columbus, Ohio, from 1970 to 1973. In a nine-to-five situation he created newspaper and magazine ads, illustrated annual reports and designed corporate identification symbols, packaging and wallpaper. During his stay in the ad art stable, Ron found himself returning again and again to the creative release of spacescaping.

"I didn't really do any astronomical painting until 1972," he states. "And those were done for an amateur SF film which never got off the ground. I took the paintings, however, and made up packaged slide sets and sold several thousand to planetariums."

Miller had made his first inroad into space art. His initial exhibit devoted solely to astronomical painting was unveiled in 1973 at the Cincinatti Midwestcon. Surprisingly enough, the newcomer made quite an impression on the attendees, with several paintings being bought. ("Mostly by Ken Moore," Ron concedes, "who is the biggest private owner of my paintings. He owns fourteen.") Ron perservered with his convention-hopping and has since become a top draw attraction, winning some 12 first-place awards and selling close to 250 paintings in the last five years.

By the end of 1973 Miller had decided he would commit all of his time and energy

"Mira Ceti" illustrates a rather hypothetical scene on an inhabited planet orbiting a double star.



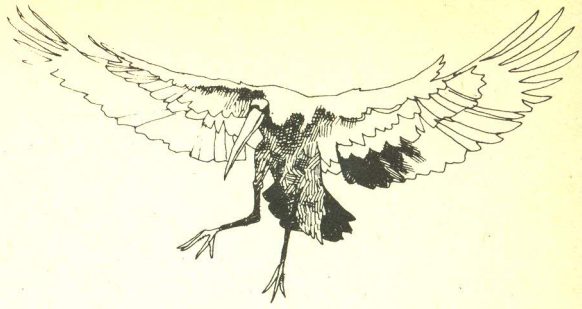
Saturn as seen from Iapetus, the only one of Saturn's moons that allows us to look down on the rings.

MILLER ART INDEX

Other fine examples of Ron Miller's astronomical art may be found in the following issues of STARLOG and FUTURE magazines:

STARLOG #13 — Interplanetary Excursions, Inc. (The Tenth Planet)
STARLOG #14 — Int. Exc. Inc. (Jupiter and Venus)
STARLOG #15 — Int. Exc. Inc. (Mars)
STARLOG #16 — Int. Exc. Inc. (Mercury)
FUTURE #1 — Civilization in Space, Chapter 1 ("The Return")
FUTURE #2 — Civilization in Space, Chapter 2 ("The Cola Wars!")
FUTURE #3 — Civilization in Space, Chapter 3 ("The First Hundred Years")
FUTURE #4 — Civilization in Space, Chapter 4 ("The Rama Arts Festival")
FUTURE #5 — Civilization in Space, Chapter 5 ("Freeman's Rebellion")

"My biggest recent project is a book called **Space Art**, a collection of space paintings which I edited. It has a Chesley Bonestell wraparound cover and 168 pages of beautiful color art. It's being published by STARLOG shortly."



to the creation of space art. December of that year Ron and Judy moved to Washington, D.C., allowing Miller to accept the position of Illustrator/Art Director with the Division of Presentations and Education in the National Air and Space Museum of the Smithsonian Institution. One of his first jobs was the creation of a series of 360-degree panoramas and other planetarium art for the Experimentarium, a small planetarium in the now-defunct "Tin Shed" Air and Space Building.

Picking up momentum with each additional assignment, Miller then began to work on the art for "Cosmic Awakening," the premiere production in the Albert Einstein Spacearium, painting over a hundred pieces of art for the show. After the inauguration of the "Cosmic" collection he went on to do the artwork for two presentations geared for schoolchildren: "Pathways to the Moon" and "Symphony of the Satellites," which opened in the fall of 1976.

Eventually Miller began working with other departments of the Air and Space Museum, most notably the Exhibits Division. His "Pick-A-Star" program in the Life Of The Universe gallery allowed visitors to choose several stellar conditions (the age of the star, its spectral class, etc) and watch a series of Ron's paintings showing the possible planets of the star chosen.

For the new Exploring The Planets gallery, Ron painted a fantastic giant Jupiter mural, which hangs over the entrance to the gallery, as well as eight other paintings for the interior. One Miller original hangs in the Gallery of Flight In The Arts, and two others are in the permanent art collection of the museum.

After four years with the National Air and Space Museum Ron resigned in 1977 to turn to freelance work. At present he is Space Art Advisor and frequent contributor to FUTURE and has, of late, painted covers for Defenders of Wildlife's magazine as well as *Starstream* and *Star Trek* comic books, and illustrations for *Astronomy, Smithsonian Magazine* and STARLOG.

As a freelancer, Ron Miller is finding that his talents are in constant demand. The master of his own fate, Miller chooses his projects carefully, picking only those that give him the most artistic pleasure. "My biggest recent project is a book called *Space Art*, a collection of space paintings which I edited," he smiles. "It has a Chesley Bonestell wraparound cover and 168 pages of beautiful color art. It's being published by STARLOG shortly.

"And my own company, Astronomical Art, is selling a poster series of four of my paintings. Portal Publications is issuing posters of two more. I did a wraparound jacket and lots of interiors for *Earthlove*, a fantasy novel by Neil McAleer."

Miller does the bulk of his spacey work in his exceedingly Earthbound studio located in the top floor of his home. Its slanted ceiling is covered with Ron's drawings, maps of the solar system and a collection of photographs of select females ranging from wife Judy to Lynda Carter. Although the paintings executed by Ron in this room seem extremely ethereal and freeflowing, each one is the product of a painstaking process that often involves weeks of legwork. When Ron does an astronomical painting, he usually starts off by telephoning or writing to the appropriate authorities to get the most up-to-date information on colors, surface conditions, climate and visual appearance. "However," he points out, "when painting a subject with which I'm thoroughly familiar, such as Saturn seen from one of its moons, I usually don't need much new information." His most-often-used source is Dr. William Hartmann of the Planetary Research Institute in Tucson, Arizona.

Information in hand, he then sometimes spends several hours laying our perspectives and determining mathematically the exact size of objects in the sky. He prefers to paint with as little preliminary sketching as possible, working out details as he goes along to maintain his own interest.

"An astronomical painting seldom takes longer than a day or two to actually execute," he says. "I may spend one day painting the landscape and the second day painting the sky. I hate to stop painting once I start, and will only stop when I've got a good place to break the painting."

Miller uses Liquitex acrylics on Strathmore illustration board. On completion he sprays a painting with acrylic varnish. He uses a Thayer and Chandler airbrush and gouache for intricate airbrush work. "I use the airbrush only when it's absolutely necessary," he points out, "for skies and other very small effects. I never use it alone for clouds. You see, very few things in nature look like they were airbrushed and so I try to restrain my use of it."

Although best known for his astronomical portraits, Miller is a well-respected nature painter, too. He doesn't see very much difference in portraying the terrain of Mars or that of a peaceful Earth valley. "As an astronomical artist," he explains, "I observe what goes on here on Earth. There's scarcely anything in the solar system which isn't duplicated in some fashion on this planet. Rocks, for example, are rocks, whether they're on the Gobi Desert or Mars. I extrapolate from terrestrial landscapes a lot. I may even display a landscape photo above my drawing table when I paint, for inspiration.

"In my painting, believability is more important than the scientific content. If I can't get a viewer to believe, I don't care about anything else. I've failed. Because of this, I try never to make a painting a hundred percent strange. If the object in the sky is strange, I make the landscape very prosaic, or vice versa. The view has to have a reference point.

"Sometimes this means that one of my paintings will be less accurate than it could be. My paintings are very simple in design, almost geometric. I concentrate on only two or three important features in a painting, subordinating everything else to these."

Ron lists his sole influences in space art as being Chesley Bonestell and Ludek Pesek. Among other modern SF and fantasy artists he admires and is influenced by are Alan Cober, Ted CoConis, Brad Holland and Jeff Jones. Yet another factor involved in Ron's work is the music he often plays while painting. "My favorite composers are Bernard Herrmann and Alan Houhannes," he reveals.

With success currently his, Ron plans to continue his astronomical pursuits but expand his vision to include other goals as well. He and his wife, for example, sometime spend their leisure time puppeteering, designing and building their own puppets as well as scripting their own shows. Ron also wants to open a small art gallery with Judy in Washington D.C., and, eventually, have the chance to publish small edition illustrated books, finely bound.

"In the future," Ron predicts, "I'd like to do a little less illustration. I really don't like the distinction made between illustration and fine art. Illustration is just fine art which tells a story. I like telling stories in my paintings."

And, for Ron Miller, imaginative space artist, the sky is not the limit for his visual storytelling, it's the starting point.

WARLORDS OF ATLANTIS

The Undersea World of Amicus

The Company That Brought You "The People That Time Forgot" and "At The Earth's Core" Try Their First Non-Burroughs Work.

By RICHARD MEYERS

The England-based studio, Amicus Productions, has always been in there punching. Ever since they launched their first teenage rock'n'roll picture in the fifties, the company has been making genre films, reaping the monetary rewards and dodging the critics' barbs. After more than two decades, the only thing that has changed is the genre. Instead of music pictures or horror movies, the organization makes its big bucks with Edgar Rice Burroughs adaptations and derivations.

A new, original production, *Warlords of Atlantis,* is no exception. What changes regularly is the name. At the time of conception it was called *Seven Cities To Atlantis.* At the time of American marketing the title was *Warlords of the Deep.* Now set for an October release by Columbia, the movie's new name remains the same — for the time being.

Though their latest uppercut has gone through a "trial-by-name change" in the world press, it promises to continue the box office bonanza Amicus has experienced in the last few years. After the success of *The Land That Time Forgot*, came *The People That Time Forgot*, with *At The Earth's Core* sandwiched between. All were produced by John Dark, all were directed by Kevin Connor and all starred Doug McClure.

What hasn't changed is Amicus' concentration on monsters, comic book heroics, creatures, pretty girls and beasts. The heroes and heroines are put through their motions this time around by veteran British screenwriter Brian Hayles. Coming from experience on overseas TV-SF like *Z Cars* and *Dr. Who,* Hayles first met producer Dark when both were interested in trying to create a program for Christopher Lee.

"John and I found we could work very well together," Hayles remembers. "And after his success with the Burroughs stories he decided to make a film of the same genre but with an original screenplay. Astronomer Carl Sagan got my imagination going by putting up the deduction that one of Mars' moons might be artificial, perhaps a satellite which went wrong. I linked this theory with one by Norbiger, a German astronomer, who claimed that the Great Flood was caused by a plunging asteroid.

"I thought: suppose the flood was caused by a satellite from Mars, an escape vessel from a dead planet? Then I thought: suppose part of the great civilization that existed on Mars set out to a new planet but on its way it bumps into the tail of, say, Halley's Comet, goes off course, crash-lands and is trapped in the Atlantic. Hence — Atlantis."

Thrust into the concept are all the fabulous residents of Mars, Earth and the undersea kingdom. Actors like Peter Gilmore, Shane Rimmer, Robert Brown, Lea Brodie and Cyd Charisse handle the human chores, but the various monsters, vicious gill-men, hostile electric eels and the occasional "zaarg" or two are handled by Special Effects Supervisor John Richardson and Monster Effects man Roger Dicken.

While Richardson, son of one of SFX's all-time greats, Cliff Richardson, sets the explosions, controls the destruction and handles the modelized monsters, Dicken, a self-made creature creator, builds them. "When I was at school in the forties the other boys were all making model airplanes and battleships," Dicken recalls, "I was making pterodactyls."

After dinosaurs, Dicken graduated to high school stage shows and model animation movies produced in his garage. Then he met Ray Harryhausen. "He had arrived in England to work on *The Mysterious Island,*" said Dicken, "and he invited me over for a talk. From that moment on I knew the only job I wanted was to create enjoyable fantasy for films."

Dicken found his specialty much in demand with the BBC and Gerry Anderson Productions. After working on the likes of *Stingray* and *Thunderbirds,* Tigon Studios gave him his first major job, asking for the giant blood-sucking moth woman in *The Blood Beast Terror.* Then followed three efforts not renowned for their subtlety: *When Dinosaurs Ruled the Earth, Scars of Dracula* and *Witchfinder General.*

"For that I had to hang a couple of witches, burn another couple at the stake and also devise a spike which drew blood without actually penetrating the skin." Just another day at work.

Richardson's road to fame was just as explosive. "I learned how to wire up safe explosives as a child," he elaborates, "just as other boys were learning their ABCs. By the age of 12, I was working alongside my dad on *Exodus.* He always said — and it was a strange expression for a man who was literally playing with fire — that I would go into the film business over his dead body. But he had to eat his words."

Sure enough, after Richardson left school, he was working on *The Victors, Lord Jim, Judith* and *The Dirty Dozen.* His first solo work was for *Duffy,* starring James Coburn; afterwards he alternated between assisting his father and working on his own. His experience in the field is unrivaled, considering that *Young Winston, Straw Dogs, The Devils, The Omen, A Bridge Too Far* and *Superman* all utilized his services.

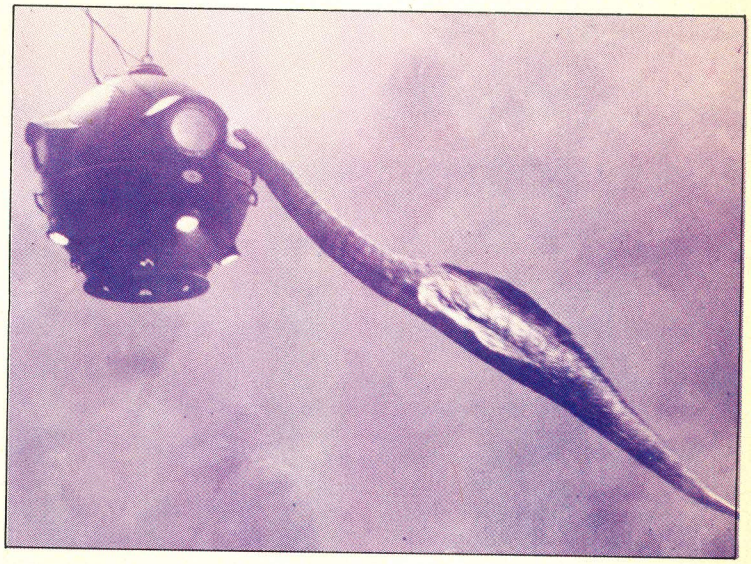
Richardson and Dicken first contributed to Amicus on different "Time Forgot" films. Dicken worked on the first, *The Land That Time Forgot,* solving a sticky problem for the producer. "John Dark told me they didn't wish to use animation on that particular film," he says, "and asked me for another technique. I came up with these very large puppet creatures. He said if I could come up with all the monsters using the same principle and with the same impact of conviction, things would be humming. So I did and that was that."

Richardson joined the crew for *The People That Time Forgot* (which Dicken missed), but both pros were on hand for the leveling of all seven cities in Atlantis. "I enjoyed the new film because I didn't have to base my monsters on prehistoric creatures. I invented a snake-fish which is a variation of the Loch Ness Monster but has large snapping jaws intent on securing a pound of flesh. The film also has a giant octopus standing nine feet high with a tentacle span of 60 feet. John, the SFX Wizard, is responsible for the actions of this 'Superocto,' as we call him. I am solely concerned with the miniature version on which the large one is based.

"Naturally, John Richardson and I worked very closely throughout the filming as he had to create the action effects and atmosphere around my handmade monsters, together with his highly skilled team of SFX assistants. Meantime, I've spent hundreds of hours on these monsters and everyone seems to like them."

More fun is supplied by zaargs — mutated monsters who are constantly attacking Atlantis — the gill-men who join the battle and Mogdaan, the gigantic man-eating horror who lurks just beneath the waves. With special guest stars like these and monster masters like Dicken and Richardson, how can *Warlords* lose.

Photos: © 1978 Columbia



Warlords of Atlantis

A Columbia Release, 1978. Produced by John Dark. Directed by Kevin Connor. Screenplay by Brian Hayles. Photography by Alan Hume. Production Supervised by Graham Easton. Production Designed by Elliot Scott. Make-up by Robin Grantham. Special Effects Supervised by John Richardson. Monster Effects by Roger Dicken.

Greg Collinson . . . Doug McClure
Charles Aitken . . . . Peter Gilmore
Atsil . . . . . Cyd Charisse
Delphine . . . . . Lea Brodie
Captain Daniels . . Shane Rimmer
Atmir . . . . . Michael Gothard
Professor Aitken . . Donald Bisset

Monsters have almost always been Amicus' bread and butter—they make sure there's always plenty of them. From the top and moving clockwise: the fierce Mogdaan, a murderous millipede, a giant flesh eating eel and an infamous rampaging Zaarg.

SPACE JUNK

IT'S TIME TO INVENT ORBITAL BAGGIES

By LEONARD DAVID

The recent Soviet Cosmos 954 crash landing in Canada (see FUTURE # 2) was a mere calling card from an even graver problem, according to a soon-to-be published NASA study.

Research by two NASA Johnson Space Center scientists, Donald Kessler and Burton G. Cour-Palais, indicate that by the year 2000, satellite debris will have created a Saturn-like ring of "space junk" around the Earth. This debris ring will be comprised of tons of fragments, caused by the collision of an overcrowded space population of satellites and spacecraft hardware.

The report predicts that before the year 2000, hyper-velocity orbital collisions may become commonplace, because of increasing space traffic. Fragments would vary in size, and would be harmful to future manned and unmanned orbital activities. And, as the number of objects in space increases, so does the possibility of more incidents similar to Cosmos 954.

The faltering radioactive Soviet satellite was not the first case of an object surviving re-entry and landing on solid ground. In September of 1962, a piece of a Soviet Sputnik weighing 21 lbs. landed on a street intersection in Manitowoc, Wisconsin. In August of 1970, Cosmos 316 plunged to Earth, peppering a path that included Kansas, Texas and Oklahoma with some 1,500 lbs. of debris. Not to be outdone by the Soviets, a 23-foot-long piece of American spacecraft crashed in Mexico earlier this year. Although these cases were non-nuclear, it does demonstrate the danger from falling space clutter.

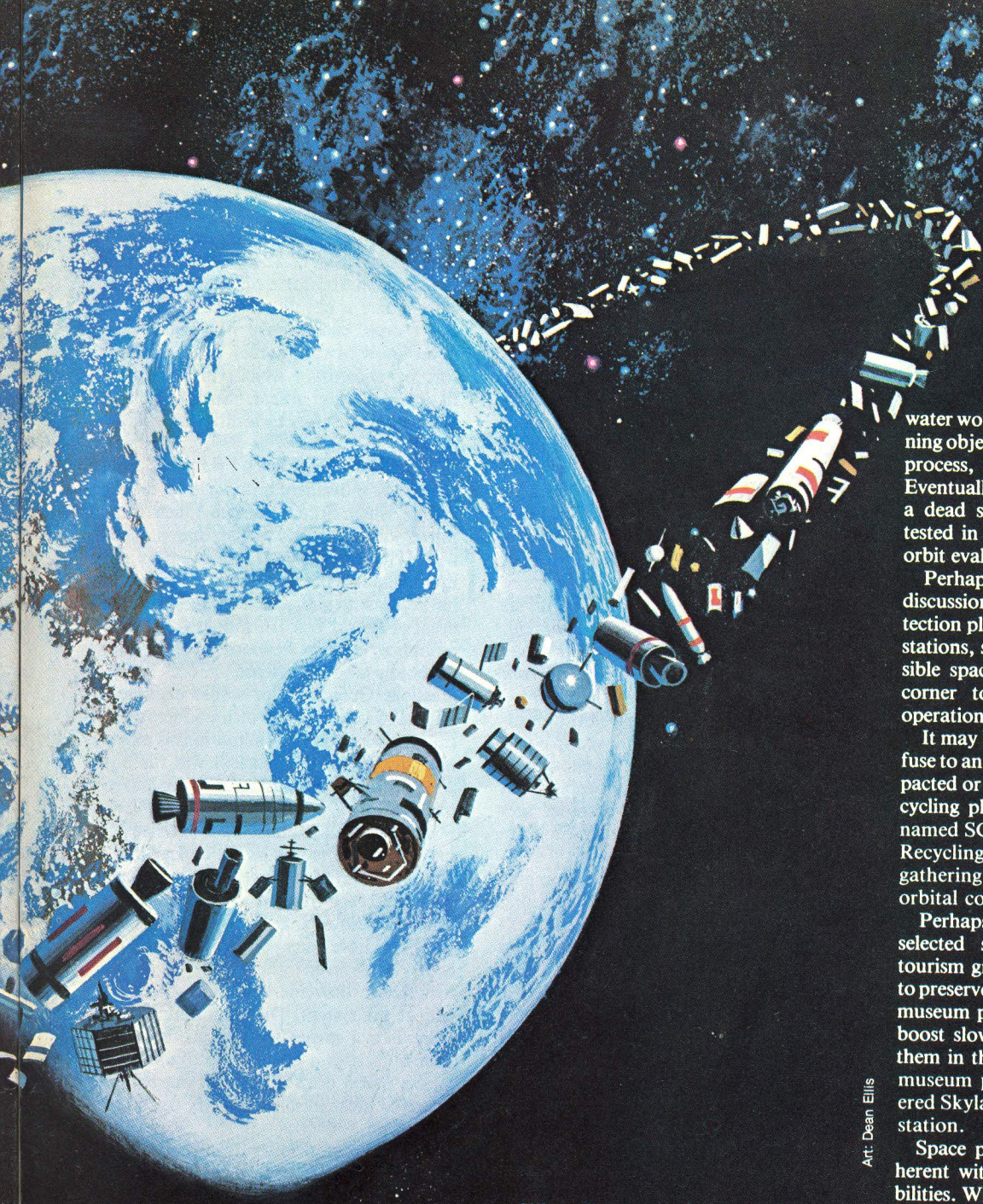
The North American Radar Air Defense (NORAD), which tracks all space objects with powerful radar, reports at least one piece of space garbage falls to Earth daily. The majority of these objects is too small to survive the fiery re-entry, and most that do fall harmlessly into the Earth's expansive oceans.

However, Cosmos 954 and the concern over the premature plunge of the massive Skylab space station, point out that space pollution is already with us today. Even as you read this, thousands of pieces of orbital junk float above us—a mixture of spent rocket engines, nose cones, and "dead" or "dying" satellites whose gasping batteries can no longer come up with a meaningful "beep." With the introduction of NASA's space shuttle and increasing numbers of other countries participating in space flight, space exploration could become hazardous to our health!

But before prospective astronauts seek out an All-Space Collision Insurance Policy, or someone writes a tune titled, "Satellites Keep Falling on my Head", consider the possible solutions.

Much of the problem could be alleviated by the space shuttle itself, acting as a garbage collection service. Shuttle orbiters can carry up to two payload "retrieval mechanisms." In essence, these mechanisms are mechanical "arms," each capable of stretching out to over 50 feet in length. By using these devices, payloads can also be deployed in space, brought out from the 60-foot by 15-foot shuttle cargo hold. Each arm is complete with television and lights to provide side viewing and depth perception. Astronauts, comfortably stationed in the shuttle cabin, can use the long arms to latch on to pieces of space junk, then haul them onboard for safe return to Earth. Larger pieces may have to be dismantled if possible, or could be maneuvered for a controlled burn-up in the Earth's atmosphere.

However, such a shuttle garbage service



Art: Dean Ellis

would be limited as to type of orbit and altitude, and there are other problems as well. Research has shown that the shuttle's control jets may "blow away" space objects before retrieval operations could begin. Now under development by NASA are novel approach techniques, utilizing intricate orbital maneuvers instead of shuttle thrusters. The result will resemble an orbital ballet between the shuttle and target object.

What about space debris tumbling out-of-control, making capture difficult or impossible? Pennsylvania State University professor Marshall Kaplan has several suggestions. One possibility would be the use of a garbage collecting space tug, under the electronic control of the shuttle crew. Such a tug could be comprised of a large rotating ring that is synchronized with a spinning space object. Special sensors would track and plot the gyrations of the object before attempting a snare. Extending from the ring's inner surface would be several metal arms to secure the body, then return it to the shuttle under the tug's own propulsion.

One additional approach by Kaplan is just to spray a satellite with water—that's right, water! Studies demonstrate that a tumbling piece of hardware would be stopped by a simple blast of water. This water would accumulate as ice on the spinning object, vaporize into space and, in the process, absorb the junk's momentum. Eventually the object would slow down to a dead stop. Kaplan's theory has been tested in a vacuum on Earth, but an in-orbit evaluation will be needed.

Perhaps it is not too early to begin discussion of an environmental space protection plan. With the potential for space stations, space industrialization, and possible space settlements right around the corner to our future, space clean-up operations may require full-time crews.

It may become cheaper to tow space refuse to an assigned orbital area, to be compacted or reprocessed at a space-based recycling plant. Such a program could be named SCRAP for Space Collecting and Recycling of Annoying Pollution—gathering space junk for reuse at other orbital construction sites.

Perhaps there will be a need to keep selected satellites in orbit? As space tourism grows, there should be measures to preserve certain spacecraft, kept aloft as museum pieces. Museum crews could reboost slowly decaying satellites, keeping them in their natural space state. Such a museum piece would be a space-weathered Skylab, the first U.S. manned space station.

Space pollution control should be inherent with the growth of orbital capabilities. What is needed is a movement for the environmental protection of space. We must be careful that we do not carry into space our Earth-like tendencies to pollute first, then ask questions later. As we live and breathe our current industrial revolution here on Earth, we should realize there is an ecosystem of space. We do not as yet understand all its properties.

Use of the Earth's oceans as a dumping ground for everything from human sewage to radioactive material should have taught us an important lesson. The philosophy of an "out of sight, out of mind" solution to pollution has come back to haunt us. With thousands upon thousands of useless space objects circling above, it is obvious that if space is the cosmic ocean, we have surely polluted its beach front. As we move into fuller utilization of the space medium, we must ensure that our own garbage will not be there to greet us.

JOHN BRUNNER

Photo: David Hutchison

PESSIMISM IS GOOD FOR YOU

By NATALIE MILLAR

Science-fiction literature is more popular than ever. Every week hundreds of thousands of books are sold to eager SF fans, detailing the pie-in-the-sky exploits of larger-than-life heroes, loyal robots, elfin aliens and sumptuous saucers. Science-fiction fantasy currently reigns supreme in most circles, although some authors attempt to avoid it totally; authors like John Brunner, whose idea of futuristic fantasy is anything but idealistic.

Hugo Award winner Brunner doesn't think *cataclysm* is a dirty word in SF. In fact he thinks that *pessimism* in the genre can be *good* for you. In such books as *Stand On Zanzibar, The Sheep Look Up, Shockwave Rider, The Stone That Never Came Down, The Whole Man* and *From This Day Forward*, Brunner has painted portraits of not-so-brave new worlds brimming with overpopulation, poverty, pollution, mass unemployment, random violence and spiraling inflation. Despite such dire happenings, however, Brunner sees the overall effect on his literary futilitarianism as being totally positive.

"Literature will have a great role to play in the reversal of today's more depressing trends, if such a thing is indeed possible," the bearded Britisher says dryly. "As a science-fiction writer I feel compelled to point out exactly where I think society is heading. Like most science-fiction writers, I'm a pessimist in my head and an optimist in my heart. If I wasn't, I couldn't go on writing my imaginary tales now, could I?"

Brunner, now a noted creator of calamity, is a veteran of over two decades of science-fiction writing; years that witnessed the emergence of the humanistic New Wave movement. In the beginning of his career, however, Brunner had not yet turned his attention to the more ominous elements of the possible future. He credits his eventual move to SF melancholia to events experienced in the real world.

"My pessimism must have grown on me during the period when I was very active in Britain in the campaign against nuclear disarmament," Brunner reveals. "I am terrified of the prospect of another war. I grew up during World War II and I have seen how the ideals that my father had espoused were brutalized by the course of war; twisted beyond recognition. It is evil to press a button for a nuclear missile and exterminate a city full of people that we don't even know, have never met, will never know by their names. It's a dreadful sort of anonymity which, in an *honest* fight, is totally absent. Such inhuman destruction belongs to a different dimension of morality.

"Feeling this way when I was younger, I joined the movement around 1958, during a time when Britain wielded much more power on the world scene than it does now. The idea behind the movement was that Britain, being the country in the world having least to gain and most to lose in the event of World War III, should voluntarily renounce nuclear weapons because they cannot be used for defense . . . only for aggression. Only an idiot would explode a nuclear weapon on his own country's territory. I was extremely active in this movement for about ten years. It was the biggest post-war political grassroots movement in Europe."

The youthful Brunner then watched the movement die at the hands of England's more conservative government officials who sold the reform wave down the Thames. "Since that time," Brunner explains, "I have been very cynical about the ability of even the best organized democratic movement in our society to change the system. The Establishment sits there like a great, foul, disgusting toad with a great grin on its collective face. It knows that it only has to wait out the patience of those idealists who try to change the system."

After his defeat in terms of social reformation, Brunner began to re-evaluate his stance as a science-fiction writer. He began to regard the genre not just as a form of literary entertainment but as a forum for social reform as well. He took some of society's more distasteful trends and placed them into futuristic settings, coming up with mind-boggling plotlines. The net result was a series of catastrophic novels and short stories which began to surface in the sixties, the most famous being *Stand On Zanzibar* — a brutally realistic portrayal of an overpopulated and desensitized future. The more optimistic writers of the SF realm, still reeling from the birth of the New Wave, regarded the young muckraker with some disdain. How dare he be so pessimistic in print? But Brunner persevered and won a Hugo, the British Fantasy Award and the British SF Award for his efforts.

Some authors like to look at the future through rose-colored glasses . . . but not John Brunner. In his opinion, envisioning the worst of all possible worlds is the only way to bring about the best.

"When talking about possible futures," he states in an attempt to explain his somewhat dour stance, "one has to distinguish very carefully between what one can foresee on the basis of present evidence and what one can envision based on the premise that *someone* will make a decision to do things differently. If you believe that society will carry on along the trends that one sees in our basic existence, then I am very much afraid that my vision of the future involves a lot of things that I would very much hate to live through: increased violence, increased interracial friction, increased corruption, unsolved crime, centralized administrations.

"Contrastingly, there is no *a priori* reason why one shouldn't foresee a much more cheerful future than I can come up with. If, for example, the kind of budget was suddenly made available for the exploration of alternative forms of energy that is now being poured into what I consider the dangerous development of nuclear power, we could very well look forward to a Utopia within a century or so. But I'm afraid *that* sort of move rests upon a change of attitude on the part of the people who wield power in our society . . . an event I consider highly unlikely. In the immortal words of the psychologist Donald P. Michael, 'Under our system, those who offer themselves for public office should immediately be disqualified because those who crave power are least fitted to wield it.' "

Relaxing in a New York hotel sitting room, Brunner becomes slightly uneasy when faced with his dismal overview of the shape of things to come, justifying it quickly. "I really wish I could be more optimistic about the future of our civilization. But it seems to me that there is one inherent flaw in the game plan which we are not even within shouting distance of rectifying. It's essentially a commercial one. Things are judged today by the price. At the same time, we constantly say that individual liberty is the most precious thing in the world. It follows, logically, that at one point or another you will run across people who are determined to buy and sell the world's most precious commodity . . . freedom. And all too often they manage it. This is a basic weakness in our society which I do not have a cure for. If I did have the answer, I wouldn't be here talking about it . . . I'd be out reforming the world."

Despite his ominous literary stance, Brunner feels that by putting these dastardly deeds-to-come on paper, he can help in some small way to actually stem the tide of these disasters in the making. The key, he believes, is in presenting these possible nightmares realistically to his readership. "I can influence people's thinking," he offers. "I have leverage of a kind which, unfortunately, very few people enjoy. I long ago gave up parading through the streets with a banner because I realized that through my writing I could reach probably tens of thousands. In this sense, I and my science-fiction colleagues are like leavening in the dough of the body politic."

Brunner realizes that he runs the risk of being labeled an SF preacher in his sociological design and has taken steps to avoid just that. "One of the worst traps a writer can fall into is to become preachy," he comments. "The only way one can get a message across in fiction is to create believable characters within the framework of the story. Characters who can justifiably hold these beliefs as their own. When I started writing science fiction I was by no means as pessimistic as I later became. I think that's because when I began writing, a lot of the worst contemporary phenomenon were not as irrevocably established as they now seem to be."

Surrounded by an SF world of wookies, happily-ever-after endings and TV retreads, Brunner still feels that it's worth delving into the risky realm of professional pessimism. "Science fiction must *necessarily* go where speculation is fiercest," he says, ignoring the current wave of SF fantasy. "During the twenties and thirties the most penetrating questions involving society were being found in physical sciences. Can we harness atomic power? Can we send a rocket to the Moon? SF reflected that. Well we did all that. We found all those answers. Now the question that remains is: If we are so smart, why aren't we clever? How can we accomplish all those great scientific achievements and yet not be able to live together in a sane society? As a natural result, the emphasis of science fiction has switched focus from the hard sciences to the so-called soft sciences, the ones that touch a human being directly. It's up to science fiction to confront the masses with the possible outcome of their present actions, to make them think."

Brunner recalls one occasion where he was given proof positive that his pessimistic pursuits were proving to be a benefit to his readership. "There is a phrase that, I believe, we owe to Shelley: 'Poets are the unofficial lawgivers of society.' To some extent this is true. At one point I did succeed in doing precisely that kind of good I had always hoped to do. *The Sheep Look Up* is a long and complex book set in the year when all the industrial pollution in North America reaches the point of being unbearable. It's exaggerated for effect. The first people I had met who had read the book were in Philadelphia at a science-fiction convention in 1972. One of the readers walked up to me and said, 'We're going to do something. My wife and I just finished reading it a few days ago, so we're not sure what we're going to do. But we are going to act. We can't let something like this happen!' That pleased me enormously. By sheer accident, the first person I had met who had read the book had been galvanized into action. Hopefully the books had a similar effect on thousands of people I shall never get to meet."

And so Brunner continues to write, continues to warn. Totalitarian dictators, scientific saviors turned oppressors, crumbling governments, racism, ruin and retribution all play a part in his outline of things to be avoided in the future. The author at this stage of the game doesn't mind being singled out as a doomsayer, either. He knows that everything has its purpose. "I really believe that this writing can influence people's ideas," he stresses again. "Harkening back to my nuclear activity days, the people most responsible for the organization were *creative* people who used their art in a similar fashion. Writers such as myself, architects, painters, musicians, teachers. People who were dedicating their life to creating something *positive* for the world that would outlast their own own lives. I am totally convinced that this is possible to achieve through science fiction."

Frazetta

(continued from page 50)

magazine and newspaper ads, but they still had to find someone who could imbue the TV commercial with the same strength and style.

"It's the archetypal mythological quest," describes Vic Zast, the agency's director of creative services, in an interview. "The hero climbs the mountain and when he reaches the top he receives the power of Sex Appeal. With uplifted palms he receives the elixir of the gods. He pulls out his sword and points it to the sky as lightning bolts flash."

The end of their own creative quest came with the arrival of Richard Williams to the project. Williams, one of the world's most noted animators, was so excited by the concept that he not only deemed it the first job for his newly opened Hollywood office, but personally handled the art chores. "He just worked it all out himself," says Carol Cooke, the painter at Williams' California studio. "It all comes from Williams' mind. He used the same type of structure of the body as the guys in the poster, I painted it and Becky Mills did the bottles and the backgrounds. Lynn Larsen assisted-animated and the lettering was done by a girl named Micki Croyman."

Other able assists were provided by a 20-piece orchestra, sound effects by Don Peiestrup, and narration by long-time voice-over expert Paul Frees (who supplied background to almost every George Pal production, including narrations for *War Of The Worlds* and *Doc Savage: Man Of Bronze*). "We did two versions of it," Carol continues. "One's called a 30 and the other is called a 25-5, because its ending has a black matte so the stores can put their names underneath—'buy at Thrifty and Save-on,' things like that."

Jovan fully expects a grand list in that 25-5 black matte since the already released print ads have resulted in increased sales and Thompson feels assured that the campaign will double Sex Appeal's appeal to both men and women. "They appreciate the tongue-in-cheek attitude," says Mr. Zast. "And the youth orientated audience will be receptive to the colorful animation."

Win, lose, or draw, the Williams Animation Studio is extremely proud of its first West Coast work. "Dick really loves that commercial," Ms. Cook confesses. "He shows it to everyone. The aerial shots in it are wonderful — it looks like you're in a helicopter. The trucks, the camera moves, the whole thing is wonderful, and it all comes from Dick's mind. I'd like to find out how he does it; the way he creates is amazing."

McCaffrey

(continued from page 23)

to the New York area and my youngest daughter went off to school. It was like 'Who pulled out the plug?' I suddenly had a lot of time on my hands. I had written a story back in the fifties called 'Restoree,' which no one had liked a lot. I rewrote it. It became what I call my space gothic novel. And it was a parody. I was so tired of reading about the girl standing in the corner wringing her hands as the hero fought for her honor. Heck, I would have been right in there swinging at the bug-eyed monsters. I would have been doing something constructive. So, I wrote this thing. A lot of science-fiction cliches were thrown in there but I wrote it so the girl had the information that the heroes usually had. The critics took it *seriously*. They slammed McCaffrey for her use of 'cliches.' I was flabbergasted. 'You *clown-heads* . . . I'm *teasing* you!' Well, finally somebody realized what I was doing. I was considered very clever for a little while."

Now an established SF author, Anne penned another novel, *Decision At Doona,* before encountering her first dragon in 1967. "I was looking around, literally, for something to do," she muses. " 'What will I write about?' So, I thunk up the dragons. I figured out that dragons had been given some pretty bad press. They hadn't been used all that much sympathetically. There were several other ideas mixing around in my head when I wrote the story, too. We had a very unpopular war going on in Viet Nam. I had been through two others as well and I was tired of watching people killing people. I often wished that we had an outside force directed against us which would unite us as a planet despite our minor differences. So I created those thread things. And then, to protect us all, came the dragons.

"I thought, gee, everyone gets lonely and wishes that they had someone who would understand them, some friend in whom they could confide. If you have a friend, you might as well have a big friend. The idea of a telepathic dragon who had only you to love, that really appealed to me. Love on equal footing. A partnership. The partnership idea also comes into the love between the characters Lessa and F'lar, which begins out of necessity and develops because of the forces against it into a real partnership. They are equal, male and female, in all respects."

Several books, countless short stories and a move from New York to Ireland later, Anne is still describing her dragon friends in glowing prose. She is very proud of her newest, *The White Dragon,* a masterful tale she simply describes as "really fun," although, she concedes lightheartedly, "it might disappoint some readers who'll be mad because they don't get to see that Red Star get killed. I just haven't figured out how to do that yet. Besides, I'm not sure it's all that bad to have something hanging over your head like the Sword of Damacles if it keeps everyone together."

Brimming with both symbolism and feminism, Anne's dragon tales have been the object of interpretation by fans and critics alike. McCaffrey herself, however, refuses to read any deep meaning in her fantasies, calling herself again and again, "a storyteller, that's all. I tell stories based on my feelings about the times that I live in. I can't help but mirror the moods of the times unconsciously in my writing."

She chuckles slyly when pressed about the ultimate meaning in her dragonrider epics. "A lot of people read more into my work than I think is really there. In its own way, I think that's good because I'm involving more people that way than I would if I had consciously gone out with a message that could only appeal to group A or group Z."

As to any other possible interpretations of her mythos-laden tales, McCaffrey is delightfully mum. And while her readers puzzle over her classic storylines, Anne, the irrepressible 'crazy American who keeps horses' in Ireland, continues to fantasize behind the typewriter in her own unique way. Dragons, dinosaurs, female spaceships and alien warfare all fit neatly into her world of writing. Safely shielded from the science-fiction editorializing rampant in America, McCaffrey enjoys a real-life world of trees and rolling hills almost as magical as the ones she creates on paper.

Never one to take things all that seriously, the designer of dragons laughs aloud when asked to reveal her own secret of success. "You take a piece of clean paper," she begins, "and you put it in the typewriter. Then you type a word. Then, another. And another. Noun. Verb. Adjective. And then you go on and on and on."

At that point, the air is filled with the contagious McCaffrey laugh, a laugh that soars higher than any dragon. Giggling slightly, she adds, "I start off with ideas. I start off with a situation and, usually, an interesting personality. It's the conflict between that personality and society that forms the plot . . . if there is one. Robert Silverberg says that none of his books have plots. But, by god, they're good reading. I'm just telling stories. I enjoy it. And," she adds with a wink, "it's nice to get paid for something you enjoy."

Extrapolative projections into the future by today's outstanding visionaries

According to the actuarial tables used by insurance companies, if you are in your 20s now you probably have about 50 years more to live. If you are in your 40s, you have only about 30 years more and if you are in your 60s your life-expectancy is only about 10 years. These tables are based on averages, of course — not everybody dies precisely at the median age of 72.5 years — but these insurance tables are the best mathematical guesses about how long you will be with us. Right?

Wrong. Recent advances in gerontology (the science of aging, not to be confused with geriatrics, the treatment of the aged) have led many sober and cautious scientists to believe that human lifespan can be doubled, tripled or even extended indefinitely in this generation. If these researchers are right, nobody can predict your life expectancy. All the traditional assumptions on which the actuarial tables rest are obsolete. You *might* live a thousand years or even longer.

Of course, science-fiction people are just about the only audience in the country not staggered by the prospect of longevity. We've been reading about it for decades, and such superstars as Heinlein, Clarke and Simak have presented the subject very thoughtfully in several novels. But . . . *longevity in this generation?* In lecturing around the country on this topic, I have found even some SF freaks find that a little far out.

Well, consider: all aspects of research on longevity are accelerating and there has probably been more advance in this area since 1970 than in all previous scientific history. For instance, when I first wrote an article on this subject in 1973, the most optimistic prediction I could find in the writings of Dr. John Bjorksten, one of the leading researchers, was that human lifespan might soon be extended to *140 years.* But only four years later, in 1977, Dr. Bjorksten told the San Francisco *Chronicle* that he expects to see human life extended to *800 years.*

This does not merely indicate that Dr. Bjorksten's personal optimism and enthusiasm have been increasing lately: he is reflecting the emerging consensus of his peers. Dr. Alex Comfort, generally regarded as the world's leading gerontologist by others in the profession (although better known to the general public for his lubricious *Joy of Sex* books) said recently, "If the scientific and medical resources of the United States alone were mobilized, aging would be conquered *within a decade.*" (Italics added.) That means most of us have a good chance of living through the Longevity Revolution.

Similarly, Dr. Paul Segall of UC-Berkeley predicts that we will be able to raise human lifespan to "400 years or more" by the 1990s. Robert Prehoda, M.D., says in his *Extended Youth* that we might eventually raise life expectancy to "1,000 years or more." Hundreds of similarly optimistic predictions by researchers currently working in life extension can be found in Albert Rosenfeld's recent book, *Prolongevity.*

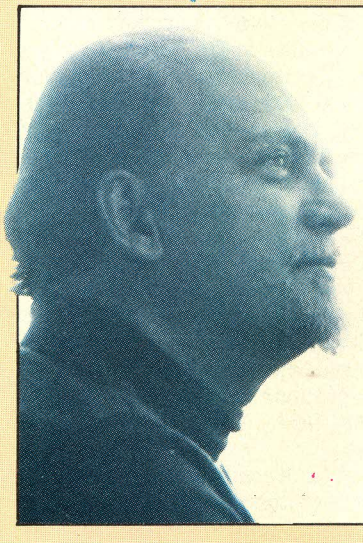
Expert opinion on longevity has grown steadily more optimistic every time it has been surveyed, because the lab results are better every year. In 1964, a group of scientists was polled on the question and predicted chemical control of aging by the early 21st Century. In 1969, two similar polls found scientific opinion predicting longevity would be achieved between 1993 (low estimate) and 2017 (high estimate.) Dr. Bernard Strehler, one of the nation's leading researchers on aging, predicted more recently that the breakthrough would occur sometime between 1981 and 2001.

At the March 1978 Alcor Life Extension conference in Los Angeles, some of the experimental results justifying such forecasts were presented. Dr. Paul Segall reported on work in which he had increased the lifespan of rats to double the normal, with some evidence of rejuvenation as well. Dr. T. Makinodan did even better with experimental fish, tripling their lifespan. Dr. Benjamin Frank reported a slowing down of aging in human subjects given nucleic acids.

The Russians have even claimed that the breakthrough has *already* been made. In August 1977, Dr. Sukharebsky and Dr. Komarov predicted that their current work would raise human lifespan to "400 years and even more." Two months later, in October 1977, two other Russian scientists, Dr. Mekhtiev and Dr. Minz, claimed to have stopped the aging process in 25 experimental human subjects.

Even cryonic freezing — the long-range gambler's approach to longevity, when it started in the 60s — is advancing by leaps and quantum jumps. An October 1975 McGraw-Hill poll found the majority of experts in the field believed cryonic freezing would be perfected and perfectly safe by 2000. Dr. Paul Segall, since then, has several times brought back to life cryonically frozen hamsters — animals which were, by all life-function readings, "dead" during their freezing. Not only were the hamsters' hearts not beating (the

Next Stop: Immortality!



Wilson

Robert Anton Wilson has published nine books and over 2000 articles ranging over a wide field from science to politics and from occultism to literary criticism. He is co-author with Robert J. Shea of the Illuminatus! *trilogy which has been adapted for the stage as a 10-hour epic rock opera presented at the National Theatre of Great Britain under the patronage of Her Majesty Elizabeth II.* Illuminatus! *has also been performed in Liverpool, Amsterdam and Frankfurt, and American productions are scheduled to open this winter in Seattle and Los Angeles. Wilson's latest book is* Cosmic Trigger *and he is currently working on four novels for Pocket Books.*

If you are in your twenties or younger, you have a good chance of living until 2098 . . . even if we can only double lifespan in this generation, we will still be around when further breakthroughs will triple it, quadruple it . . . then some of us will be here for the next quantum jump . . . Immortality.

1960s' definition of death) but even their brain waves stopped (the 1978 definition of death); yet, after revival, they were as frisky and playful as if they had just had a good nap.

The full impact of the Longevity Revolution can only be grasped by considering the "extremists" in the field — those who are aiming beyond life extension to physical immortality. Albert Rosenfeld, science editor for *Saturday Review,* devotes a whole chapter of his *Prolongevity* to these Immortalists (as they call themselves) and he does not treat them with contempt. Among the leading Immortalists are Dr. Paul Segall (already mentioned several times here), novelist Alan Harrington, a Christian clergyman named A. Stuart Otto, who heads a group called The Committee for the Elimination of Death, and the ever-controversial Dr. Timothy Leary, who is currently touring the college lecture circuit preaching life-extension with the same fervor he once gave to consciousness expansion.

Some of the mainstream longevity researchers also seem to be closet Immortalists. Dr. Bernard Strehler, for instance, usually talks only of life-extension, but in an interview with Rosenfeld he stated flatly, "Man will never be contented until he conquers death."

The basic Immortalist argument runs as follows. Be as conservative as you like in estimating the probable life-extension breakthroughs of the next two or three decades. Assume the relatively tame prediction made by Dr. Bjorksten back in 1973, when this research was (by comparison with its present status) in its infancy. Say that Bjorksten was right then and we can only expect to see lifespan increased to 140 years in the near future.

But this means that, if you are in your 40s, you will probably not be hauled off-stage by the Grim Reaper in 2008, as the insurance companies are betting. You will probably still be here in 2078. And if you are in your twenties or younger, you have a good chance of being around until 2098.

But if you will be around that long, what will happen in the meanwhile?

Even if the current predictions of such learned scientists as Dr. Segall, Dr. Prehoda and Dr. Komarov — projecting life spans of 400-1000 years — are a generation premature, two generations premature or even three or four generations premature, still, you have a good chance of being here when these dreams are achieved.

In short, even if we can only double lifespan in this generation, we will still be around when further breakthroughs will probably triple it, quadruple it or raise it into millenniums.

And then some of us will be here when the next quantum jump in lifespan occurs, and the next, until Immortality is achieved.

Longevity, Rosenfeld says, means "to have time to travel everywhere, and go back again and again to favorite places. To go on learning — new skills, new sports, new languages, new musical instruments. To undertake a variety of careers and a diversity of relationships; for some, perhaps, a diversity of marriages. To read everything you want to read. To listen to all the music. To look at all the pictures, and even paint a few. To savor and resavor experience and arrive, not at boredom, but at new levels of appreciation."

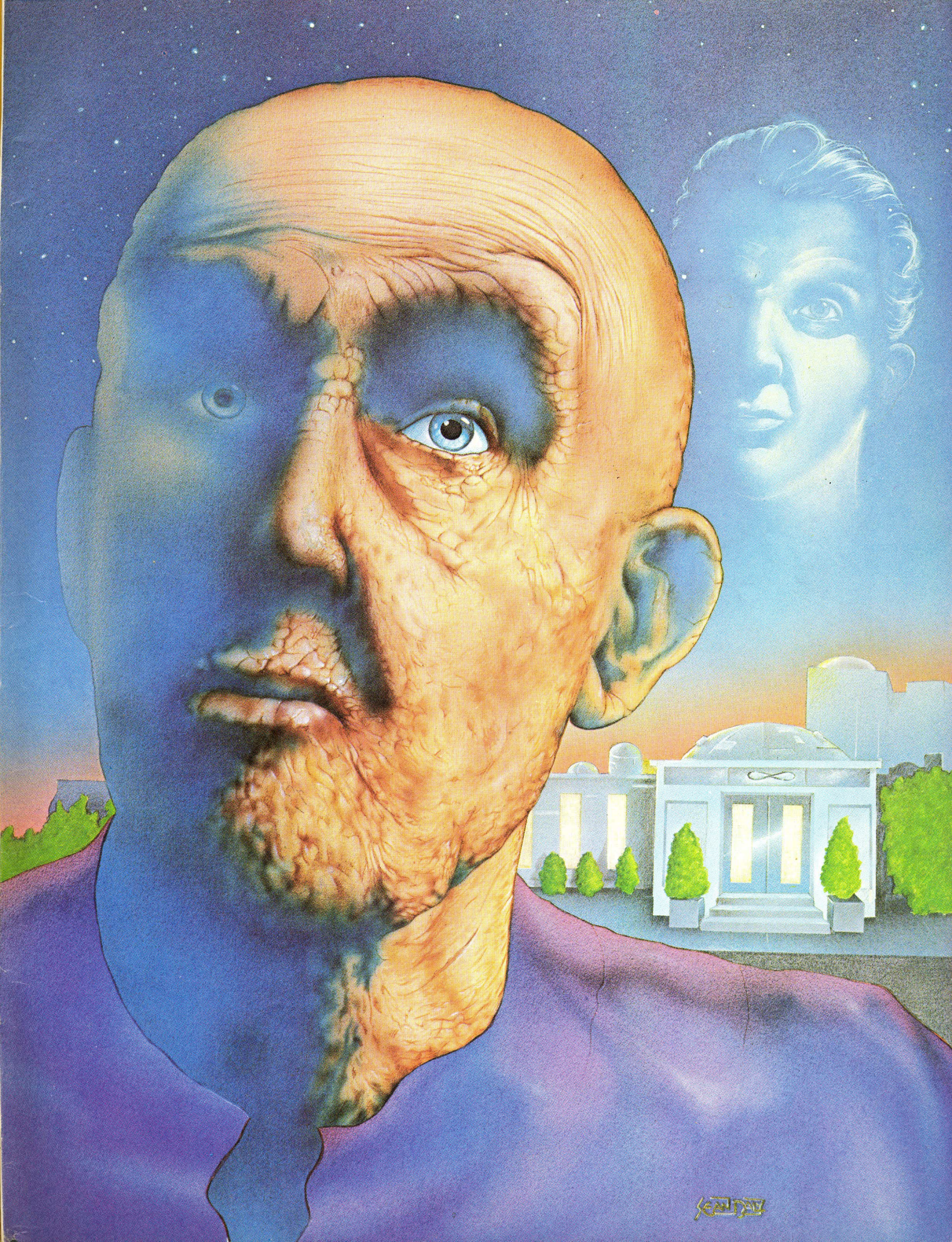
Well, yes, but that's only part of what longevity offers. It means, also, to live through more scientific and technological breakthroughs than humanity has experienced in its whole history. (After all, every branch of knowledge is increasing at an accelerating rate these days.) To live through the Age of Abundance predicted by Buckminster Fuller, when Space Industrialization ends the Malthusian crunch of planetside living and poverty disappears once and for all. To be around when physicists tap the zero-point energy and give us Super-Abundance. To see the consciousness revolution of the 60s blossom, as Tim Leary predicts, into an intelligence revolution, as we learn to program our nervous systems as efficiently as we program computers. To see a world without stupidity, poverty, neuroses and war, where the human brain will at last function smoothly, efficiently and ecstatically, to solve problems, maximize personal growth and enjoyment, free itself of imprinted limitations and fears.

To live in O'Neill's space towns and space cities and then to move on, with the next expanding wave, to the stars. To meet new friends, as human-dolphin, human-primate and human-extraterrestrial communication leap forward. To have unlimited space, unlimited time and unlimited consciousness to enjoy space and time. Possibly, to see time-travel achieved and share in its fallout, Immortality, when we can go anywhere in the past or future, stay as long as we want, and come back to the moment we left.

There is no Utopian scenario we can dream of for our descendants that cannot be ours, too . . . if the Longevity Revolution is made our top national priority. I can't see why anything else should be a higher priority: there's nothing more worth living for than life itself. A crash project, similar to the Atom Bomb race of the 40s or the Space race of the 60s would certainly produce dramatic results within a decade. (We had the A-bomb five years after Roosevelt made it a national priority, the first man on the Moon eight years after Kennedy made that our goal.)

We have spent billions on Death since the cold war began 31 years ago; it is time we spent an equal amount on Life.

After all, if reading science-fiction is so much fun, wouldn't living it be even more of a turn-on?



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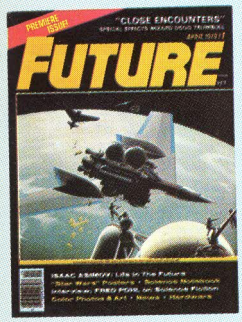
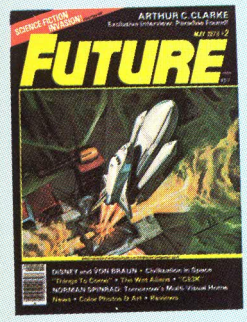
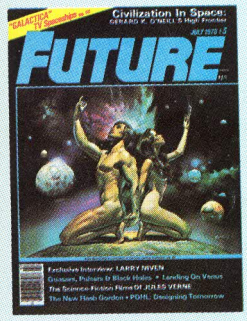


#1 — $3.50
PREMIERE ISSUE
Interview: Fred Pohl. "Star Wars" posters. Chelsey Bonestell art. "Man From Planet X." Tomorrow: Isaac Asimov.



#2 — $3.00
Interview: Arthur C. Clarke. "Things To Come." The Wet Aliens: Dolphins. Disney and von Braun. Dr. Hynek's UFO story. "Manitou" make-up effects. Tomorrow: Norman Spinrad.



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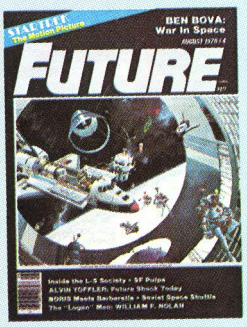

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perspectives

I would like to depart from my usual free wheeling, deep-space philosophizing for a bit to echo the sentiments expressed by publisher Kerry O'Quinn in this issue's "Output" column.

Dedicated followers of science fiction bear a responsibility, as a group, greater than that of any other fan circle. The *raison d'etre* for science fiction is not just entertainment — although it does provide that very nicely. SF writers present alternate blueprints for the future; *our* future. It is up to us to choose the scenario that we would like to see realized and then commit our time and energy toward that end. We can shape our future, but it cannot be done simply by paying lip-service to an idea or an ideal. No matter what shape our future society takes, I'd still like to see an individual's personal freedoms protected by the law and its equitable enforcement. We're familiar enough with those SF scenarios that present a future society run by an impenetrable, impersonal, totalitarian regime. It is neither a pretty picture nor an impossibility. We have little choice but to act as though a threat to *one* citizen's rights is a threat to us *all*.

Now for some deep-spacing . . .

Let us consider the process of life-into-death as we have come to know it. Living systems, both gross and minute, are subject to certain predictable, sequential events. We traditionally label these patterns of change as stages of growth and decay; living and dying. And although the timetables for these events may vary greatly from system to system, they are observable and can be predicted for everything from a human being to a star.

However, we now know that stars don't necessarily have to die — if they're big enough. They may undergo an astonishingly violent transformation and become mysterious black holes, more of which are being discovered all the time. These are not simply hulks of dead stars but something else entirely.

And as you may have already noted in Robert Anton Wilson's vision of tomorrow (see page 75), humanity is now embarked on a course of experimentation that can significantly alter the chain of events that we call *aging*. This will, in turn, alter our perception of what we call *death* — a concept whose definition has already undergone radical, unprecedented changes in the past few years.

And as we increase our knowledge and control over human longevity we are also adding to our knowledge of stellar mechanics. Now, for the first time, scientists are seriously entertaining ideas about manipulating and controlling a star's energy output. In an upcoming issue of FUTURE you will read about one such proposal called a Dyson sphere — named after the eminent physicist who developed the idea. The concept and scope of the project are truly awesome, sounding more like science fiction than science faction. And yet, if life-extension breakthroughs continue apace, we may actually be around to partake in the reshaping of our solar system. Ah, but as every reader of SF knows, that may still be just the beginning.

Many SF writers have dealt with the logical extension of human evolution, granting that we, ourselves, are not the finished product (which seems fair enough to me). So far, species have been found to evolve as a part of a process of adaptation to environments. In the 1940s, SF master A.E. Van Vogt put two and two together and came up with a short story called "The Silkie." In it he posited a race of humans which had successfully adapted to personal interstellar travel — without the aid of any ship or artificial environment: true star people.

That, I believe, is what we have to look forward to. And we may even be around to see it . . .

Howard Zimmerman/Editor

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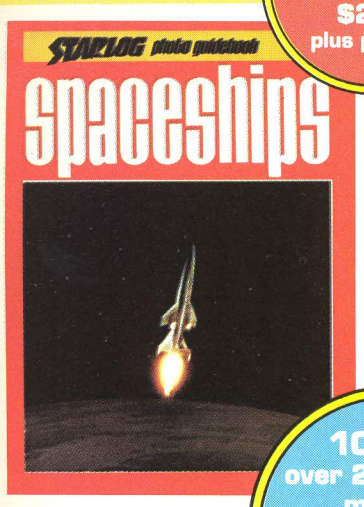

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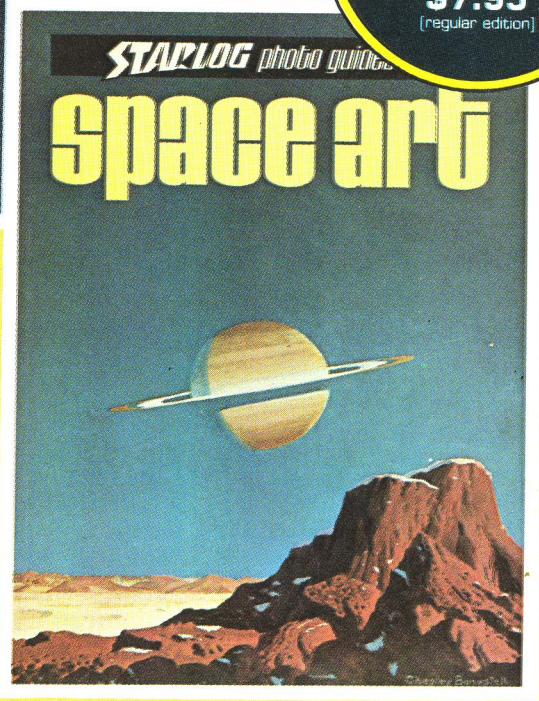

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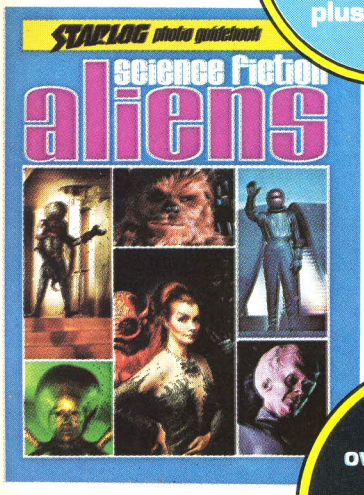

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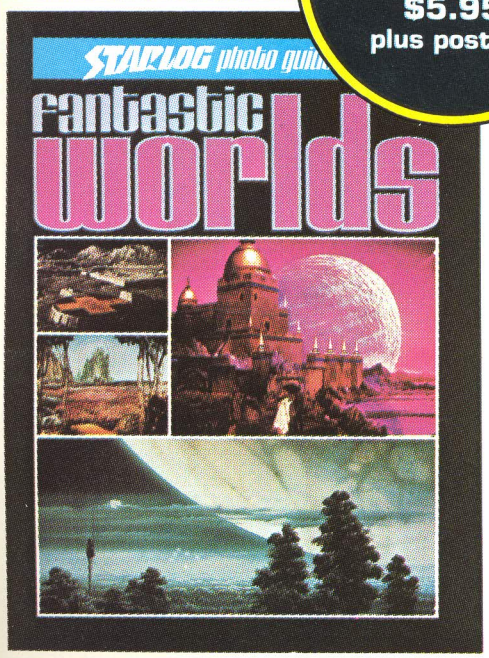

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